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ROYAL COMMISSION ON HEALTH SERVICES

THE HEALTH OF THE CANADIAN PEOPLE

ROBERT KOHN

1965


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ROYAL COMMISSION ON HEALTH SERVICES

THE HEALTH OF THE CANADIAN PEOPLE

Robert Kohn

*Publication of this study by the Royal
Commission on Health Services does not
necessarily involve acceptance by the
Commissioners of all the statements and
opinions therein contained.*

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FOREWORD

This study has been prepared on behalf of the Royal Commission on Health Services. Health services like any other services, must be studied and evaluated against the purpose which they are designed to serve. The best possible health care to be available to all Canadians, on which the Royal Commission has made recommendations according to its Terms of Reference, is the kind of care which would lead to the best possible health of Canadians according to existing knowledge, and which would achieve this goal in the most effective and efficient manner. Health services, then have to be viewed in the light of health needs, just as transportation services, for instance, would have to be analysed in terms of people and goods to be transported. To provide this necessary background is the objective of this volume.

The more complex the collective activities and organizations of modern society become, the greater the need for corresponding procedures of accounting for such activities and of evaluating social organization in the various fields. Fortunately, modern data processing techniques keep pace with the growing demand for more complete and more complex data. In the economic field the accounting is achieved by the system of current national accounts, prepared and published quarterly and supplemented by the monthly and weekly publication of certain indicators. There are monthly reports on the labour market situation. Information on a host of other characteristics – economic, educational, social – of the people of Canada is gathered every five or ten years in the Census. There is however, no such regular stock-taking of the health of Canadians. We have to rely instead on statistics regarding certain limited aspects of health and illness, such as regular series on deaths and their causes, certain communicable diseases or more recently of hospitalization and its causes. But while in the economic sphere we collect and publish regular annual statistics on such matters as macaroni and kindred products, corsets, or paper boxes and bags, we lack as yet statistical information on most of our major health and welfare problems. This is not to belittle the usefulness of the former statistical projects where data may be easier to come by than they are in the health and welfare field, but one would think that knowing the extent and characteristics of cancer and other major diseases, or the circumstances of Canada's aged population or those of the poor would warrant the effort to obtain the relevant information.

The need for some assessment of the health status of the Canadian people has become apparent whenever matters of health services became a major public concern. The National Committee for Mental Hygiene (Canada) completed a "Study of the Distribution of Medical Care and Public Health Services in Canada" in 1939. The Royal Commission on Dominion-Provincial Relations (Rowell-Sirois Report, 1940) commissioned a study on public health (by A.E. Grauer), and the Dominion-Provincial Conference on Reconstruction had a Health Reference Book prepared which provided certain health indicators and trends as background material for the evaluation of specific services. There were several up-dated re-issues of the Health Reference Book but they lapsed after a few years. In 1948, the system of federal grants under the National Health Programme commenced. The impact of this programme on the provincial health services necessitated "the collection of comprehensive data for understanding health problems and establishing priorities for dealing with these problems".¹ This led to the Canadian Sickness Survey 1950-51 which was to supplement the surveys undertaken by the provinces of their health service needs.

The annual reports of the Department of Pensions and National Health during the period from 1935 to 1942 contained in the Introductory Letter a statement on "The Health of Canada" based largely on vital and communicable disease statistics and significant to departmental activities. This practice was eventually discontinued but later resumed, though for a few years only, by the newly formed Department of National Health and Welfare. Some of the provincial health departments also introduce their annual reports by a brief summary of demographic, vital and communicable disease statistics.

The Canada Year Book publishes annually abstracts from the major statistical series but without an attempt at co-ordinating them in any way.

The Canadian Sickness Survey may be taken as an expression of the need for supplementing the existing series of vital statistics, institutional statistics, and communicable disease statistics by data on health problems not adequately reflected by these series.

When the Royal Commission on Health Services embarked on its work and required data on the health status and health problems of the Canadian people, it had neither the time nor the resources to undertake another sickness survey which would have had to include some measurement of the extent of mental illness. The alternative was to use the existing data, including those from the old Canadian Sickness Survey and some data from other countries, to observe trends and evaluate the various health problems with emphasis on their respective demand for health services and their importance in relation to one another. This is the purpose of this study.

The resulting use of outdated statistics, generalizations from data of limited scope, and comparisons of data which are not strictly comparable inevitably result in a patchwork which, like ill-fitting and incomplete pieces of a jig-saw puzzle,

¹Department of National Health and Welfare and Dominion Bureau of Statistics, *Illness and Health Care in Canada, Canadian Sickness Survey 1950-51*, Ottawa: Queen's Printer, 1960, p. 15.

leave gaps in some respects and overlap in others. It can only be hoped, nevertheless, that the conclusions will still be valid, at least in a general way, and that the need for more complete, current, and coherent data will be recognized. Under these circumstances a study of the health condition of the people may well be introduced with the very words Sir William Petty used almost three hundred years ago to preface his *Political Arithmetic, Concerning the Growth of the City of London*, hoping that the estimates and conclusions presented are "not so false as to destroy the argument they are brought for; but, at worst, are sufficient, as Suppositions, to shew the way to that knowledge I am at".

The nagging suspicion is almost certain to be proven correct, that in this study important references and existing sources of information have been overlooked. Where this is the case, it is due primarily to negligence, but partly it may also be explained by the lack of accessibility of many sources, and the absence of some central inventory of Canadian health research and statistics.

It should be obvious that this study is intended only to provide statistical background material and facts for the information of the Commissioners and the readers of their report: its interpretation and the conclusions from a medical point of view must be left to others. It is a case of lay diagnosis, something rightly shunned when it comes to determining health or illness in the individual. In the case of a largely statistical study like the present one, however, the physician has already applied his necessary knowledge in most of the various source records. All that remains to be done is to compile his findings into aggregates applicable to the community most of whose individual members are under the physician's care when it is needed.

To the reader who looks at this study mainly for epidemiological data on the incidence and prevalence of various diseases, it will be disconcerting that the work is so slow getting down to brass tacks: much of the first two chapters will appear extraneous to those familiar with the traditional design and content of health or sickness studies. It should become apparent, however, from the first chapter that the study attempts to draw attention to the many attributes of positive health and many known but often not measurable factors contributing to health or illness. These are the matters of the structure and the distribution of the population, its demographic and social characteristics, and its environment as part of human ecology and of social rather than clinical medicine. For those looking for tangible facts and figures regarding diseases it will be easy enough to skip the lengthy discourse of the first two chapters.

Among the shortcomings of the study is its unevenness: too much space is devoted to some aspects and too little to others, while some subjects which should have been discussed may have been omitted altogether. To some extent this is due to arbitrary preference for which there is no excuse. In some cases, however, it constitutes a deliberate attempt to highlight factors usually neglected as affecting the health of the people, or it is simply due to the fact that more information was available for some aspects than for others.

That Mr. Justice E.M. Hall, Chairman of the Commission; the Commissioners and Professor B.R. Blishen, the Commission's Director of Research and now of

Trent University accepted this exercise as serving their purpose, is greatly appreciated, as are Professor Blishen's editorial suggestions.

The aforesaid will make it clear that the study contains no original data and that the information comes from many sources which, while acknowledged in the text, deserve additional credit because in many cases those supplying the data also supplemented them with valuable interpretations and ideas. Annotations and footnote references indicate the debt owed to the many whose ideas and the facility to express them were borrowed. The Vital Statistics Section of the Dominion Bureau of Statistics and Physicians Services Incorporated prepared material specifically for this study. Thanks are due, furthermore, to the many experts in universities, health departments and health service programmes who kindly offered advice and read preliminary drafts of the study. All of which of course, does not absolve the author from any misjudgment that may be found in the interpretation of, and the conclusions drawn from, the material he obtained from others.

While the interpretation of the many statistics used in this study has been an often fascinating pastime, their compilation and checking involved many hours of painstaking and tedious work for those on the staff of the Royal Commission on Health Services who so ably and cheerfully assisted in the work.

To Mr. L. Tessier and his staff at the Dominion Bureau of Statistics thanks are due for the expertise that went into the graphic presentations they so kindly provided for the study.

Substantial computations relating to some of the effects of premature mortality were prepared by Mr. K. Barnes and many tables were prepared by Mrs. V. Watkins. The typing and proof reading arranged by Mrs. Armstrong and done by Mrs. E. Dawe, Mrs. R. Dupuis, Mrs. E. Jones, Mrs. C. Lam, Miss P. Laurin, Mrs. S. Richard, Mrs. C. Alary, and Mrs. H. Maley proved more than the usual routine job not only because of the difficulties in deciphering handwriting, because of unfamiliar terms, of tables, and author's second thoughts, but also because health being everybody's concern led to many useful discussions of the subject matter among all those involved in the processing.

A great debt is owed to Mrs. H. Roney, the Secretary of the Royal Commission, for a healthy balance between encouragement on the one hand, and on the other ensuring some resemblance of manageable proportions of the study, and also for her very helpful editing.

In the final but decisive stages of the study, a good fortune sent along Mr. Yves Bériault who gave invaluable help by research into source material in many areas of the study, and also by providing many stimulating ideas and suggestions. His legal background was particularly helpful in compiling the inventory of health legislation.

Since some time had elapsed between the preparation of the original manuscript of this study and its processing for publication, it was possible to add more recent data and references than were available for the Report of the Royal Commission on Health Services.

The study commences with a prospectus dealing with the difficulties in finding a simple answer to the question "how healthy are Canadians?" (Chapter 1). It proceeds with a description of the people and their characteristics having a bearing on health (Chapter 2). Vital and health statistics are presented in Chapters 3 and 4, followed by an appraisal of the relative impact of various diagnostic classes (Chapter 5). Health characteristics of certain population groups are described in Chapter 6, and additional socio-economic aspects in Chapter 7. A statistical summary is presented in Appendix A, and a selective list of health legislation in Appendix B.

Robert Kohn

The Johns Hopkins University,
Baltimore, Md.,
1966

PROSPECTUS

PURPOSE OF STUDY

“Will not the knowledge of it (the good), then, have a great influence on life? Shall we not, like archers who have a mark to aim at, be more likely to hit upon what is right?
“Though it is worth while to attain the end merely for one man, it is fine and more godlike to attain it for a nation.”

Aristotle — *Ethica Nicomachaea*, Chapter 2.

Good health is not only a mark we are aiming at in our behaviour and conduct as individuals, but collectively, as the health of a people, it forms a major and essential part of the well-being of that people. Since the ultimate objective of social organization and activity is the protection and furtherance of the interests and well-being of the community as a whole, the community, society, or its political form, i.e., the state is concerned with the health of the people. This is true regardless of the extent to which society takes an active part in providing or financing health services. It is similar in the economic field even where the state leaves economic activity very largely to private initiative and enterprise, it will still closely observe the economic status of the community.

This applies also to the health field. It is not the purpose of this study to investigate the need for public action in the provision of health services: this has been done by the Royal Commission on Health Services. Long before the Commission submitted its Report, it had become apparent that the public has an interest in the collective health of its members. This interest is obvious in the area of protection against communicable diseases but it has already been extended far beyond that. The modern state has accepted the responsibility for providing health care to those who cannot provide it themselves or have neglected to do so in the past. Furthermore, the fact that even before the completion of the Royal Commission inquiry huge amounts of public funds were spent on health services and facilities, makes it imperative for the agencies concerned to have an account of the nation's health.

Such an account, therefore, is to serve two basic objectives: first, it adds to the description of the condition of the Canadian people, supplementing the economic accounting and the account of a wide range of social conditions in the Census

and other surveys; second, it is a necessary prerequisite in the planning and evaluation of health services.

Before attempting to describe or measure the state of health, thus contributing to the existing data on the economic, demographic, educational, employment, and other social aspects of the state of the people, it would be well to delineate the area of health. This is rendered difficult because some aspects of health are closely related to social characteristics such as age, economic status, education, natural and social environment, and other factors. In fact, the often quoted and widely accepted description of health in the constitution of the World Health Organization, makes health synonymous with social well-being.¹ In other words, a high standard of health thus understood also means a high standard of social well-being or, inversely, the achievement of social well-being also means the achievement of health which would be impossible without social well-being. This is vaguely recognized and accepted, although we lack as yet precise definitions of the terms "health", "social", and "well-being". Thus the general state of a people is at least largely reflected by its state of health or, if we look at it from the point of view of social policy, social policy can be evaluated largely in terms of the degree of health it achieves among the population. Even if one does not fully agree with the concept of the synonymy of health and general welfare (i.e., welfare in its broad sense, not just public assistance), a considerable degree of interrelationship exists. It is therefore surprising that no permanent evaluation of the health status of the Canadian people, as well as of many welfare aspects, has been developed to this date. Certainly these are important aspects of the condition of the people, and one would expect them to be well established by now within "a scheme of co-ordinated social and economic statistics".² Adequate statistics are the first requirement for the assessment of the health status. The Royal Commission on Health Services has discussed this aspect³ and proposed steps for remedying the situation. Apart, however, from the organizational and administrative problems of obtaining data reflecting adequately the health status of the Canadian people, there are many fundamental conceptual problems to be solved before one could hope to see as unequivocal an account of Canada's health as it exists in the national accounts for the economy.

The present study cannot hope to come near a solution of these problems and to substitute for the intensive and multidisciplinary research needed. What it attempts is merely to bring together existing piecemeal statistical sources and illustrate directions in which their interpretation might move.

There are many directions in which good health statistics can provide guidance. Health being such an important factor in determining "the condition of the people",⁴

¹ "Health is a state of complete physical, mental and social well-being and not merely the absence of disease and infirmity" (Constitution of the World Health Organization).

² The Statistics Act (1948, c. 45, s. 1, as amended), Revised Statutes of Canada, 1952, Volume IV, Chapter 257, Section 3 (d).

³ Report of the Royal Commission on Health Services, Ottawa, Queen's Printer 1965, Vol. II.

⁴ The Statistics Act, op. cit., Section 3 (a).

this condition cannot be fully assessed without knowledge of the health aspect. And, it is the condition of the people which is the ultimate touchstone of the social and economic policy pursued by society: the healthier, richer, better educated, housed, and generally socially adjusted it is, the more we judge these policies as having succeeded.

More specifically, data on health provide the background for medical and epidemiological research and, as already pointed out, they are essential in the planning, operation, and evaluation of the health services.

As it is the provision of health services with which the Royal Commission on Health Services was concerned, this study will emphasize in the assessment of the various health problems their demand for and their impact on the various types of health services. Thus it is their social and economic importance rather than their epidemiological characteristics which will be studied in an attempt to present the various health problems quantitatively in their proper perspective in terms of their effects on the individual and the community.

SCOPE

The emphasis in this study on the relationship between health and health services also helps to delineate the subject matter. For the purpose at hand, then, the concept of health will be narrower than the above cited which identifies health with well-being in a most general sense. While we cannot overlook the social implications of health and ill health, measures to promote social well-being as such will be peripheral to this investigation; to exclude them completely, however, would mean disregarding some important aspects of the health of the community. Reference will have to be made to the interrelationship between the individual's and the community's state of health. It will also become apparent when discussing certain population groups, such as the aging or the people of the North, that health services will remain ineffective beyond a certain stage unless they are supplemented by the development of other community services.

By and large then the scope of this study is restricted to matters of physical and mental health, i.e., those matters for which health services proper are required. But circumscribing health in terms of health service we are still faced with borderlines which recede in several directions as we approach them: a large part of the services provided to hospital patients is not health or disease specific, e.g., much of the food and laundry service; an important and essential part of an organized home care plan is the homemaker service which as such is not a health service if we define health services as applying medical knowledge or techniques. In the chain of rehabilitation services, too, there is no clear dividing line for instance between occupational therapy and vocational training, between sheltered work as therapy and as a form of employment. Many activities of a general preventive nature aimed at health maintenance are often difficult to distinguish from the general pattern of living and behaving on the one side, and from consciously health directed measures on the other: examples are sport and recreational activities as entertainment as well as contributions to fitness, general nutrition and specific diets,

clothing and housing for fun and comfort or for protection. Yet, recreation and relaxation, nutrition and housing do probably affect our health in the long run at least as much as some of the wonder drugs or other treatment techniques with their more immediate and therefore more spectacular results.

Dubos speaks of health as a mirage,¹ as something which eludes perfect attainment. Its concept varies with the evolution not only of the sciences but also of social thought. While the area of physical health, both positive and negative, appears fairly well circumscribed, the development of psychiatry and new concepts of mental health are obliterating dividing lines not only between physical and mental health by extending the field of psychosomatic disorders but also by drawing the wide range of social maladjustment leading to delinquency into the sphere of psychiatric disorder. The stresses of living in this modern world on the one hand, and the use made of increasing leisure time on the other, are becoming increasingly accepted as factors affecting physical and mental health. Certain measures of environmental sanitation, such as safe water supply and sanitation services, have become so well established and routine that they are often no longer considered as part of the health services but rather as engineering matters. On the other hand, certain consequences of engineering and industrial development are becoming recognized as health hazards as, for instance, the effects of radiation, air pollution, food additives, or the accidents caused by the use of motor vehicles. Nor are health facilities, such as hospitals, any longer clearly defined. Hospitals have developed from their original role as largely charitable asylums for the sick to symbols of the highest concentration of medical and scientific advance as embodied in the acute treatment hospital; but here, too, the distinction between health and other community institutions becomes blurred when we follow the line from the acute treatment hospitals to convalescent and nursing homes, or from rehabilitation centres to sheltered workshops.

When all this has been said, however, we find that the bulk of health services in terms of both their personnel and facilities are well defined or definable. Reference has been made to health services in order to describe the scope of this study, the main objective of which is the evaluation of health and health problems in terms of their impact on society and particularly on the health services.

THE IMAGE AND MIRAGE OF HEALTH

The purpose of health services is to preserve and improve the health of the people or to minimize the consequences of ill health. Hence, their effectiveness will be judged, in the final analysis, by the extent to which they succeed, thus making an assessment of the health of the people a necessary prerequisite for an examination of the need for and the effectiveness of health services. What is needed is the answer to some simple questions. How good is the health of the Canadian people? Is it better today than it was, say, ten or fifty years ago? How does it compare with other countries? There are, however, no simple answers to these questions because of difficulties in defining and measuring health as such.

¹ Dubos, R., *Mirage of Health*, New York, Harper and Brothers, 1959.

In order to assess health in a quantitative way, permitting measurement and comparisons which would provide the desired answers, the objective would first have to be defined in measurable terms.

In explaining the scope of this inquiry, health has been described as the physical and mental well-being towards which health services are directed. It was further noted that this well-being is also influenced by nutrition, housing, sanitation, personal hygiene and habits, exercise and the use of leisure time generally; in short, by matters at best peripheral to health services though they in turn may be guided by such health services as health education in its many forms.

Having described health as embodying certain types of well-being (physical and mental for the purpose of this study) does not bring us much nearer to a definition as it still begs the question, what is well-being? An answer to this question must lead to value judgments without an objective basis and therefore subject to variation from one group or period to another, and from individual to individual. One probably would have to add to physical and mental well-being a third dimension of what may be termed spiritual well-being, i.e., the feeling of being sound and in harmony with one's environment. This is bound to vary from culture to culture but even in our own society it is a matter of whether we determine harmonious adjustment from the point of view of the individual or of society. Are we going to find it in the conformist or the rebel, the organization man, be he in overalls or grey flannel suit, or in the dissenter, a Henri David Thoreau, or the beatnik? Again it is difficult to distinguish between physical, mental, and social well-being; the ancient postulate of 'καλὸς κ' ἀγαθός' – being bodily and morally sound – is brought to mind and the wholeness resulting from a *mens sana in corpore sano*. The concept of combining the individual's soundness in body and mind with his social role has, however, been lost as medical science progressed and became able to deal more effectively with specific disease problems, hence, also, the progressive specialization of medicine to a point where it almost seemed as if the general physician no longer had a significant role to play. When again attention began to be focussed on developing health as such, a national fitness programme was instituted basically as a matter of general welfare rather than health. A new synthesis of the special treatment of specific diseases or parts of the body with man's functioning in his environment may come about as a result of the new concepts of social medicine, looking at the whole patient, and perhaps a new type of physician trained to observe the health of the whole man rather than specific problems which the specialist has come to deal with so effectively.

At a first glance this groping for a definition of health may appear an academic exercise because we all have a fairly good idea of what we mean when we say a person is healthy: we consider him to be in sound health. A thought that comes to mind then is that we frequently qualify the term in order to denote whether we refer to the concept of positive, good or sound health, or whether we mean the negative referring to poor or ill health. In equating health with well-being, as in the constitution of the World Health Organization, the reference is, of course, to the positive side of health, and it is made clear that the reference is to a positive

state which is more than “merely the absence of disease or infirmity”. This might be a state which in quantitative assessment may be given a full 100 per cent, or a perfect score. That man can ever attain such a state is doubted by some. It is the mirage Dubos speaks of as “but a dream remembered from imaginings of a Garden of Eden” or, quoting Hesiod, from a golden age “undarkened by sufferings” when men “died as if falling asleep”;¹ perfect health and happiness will remain an idle dream because man cannot hope to find another Paradise on earth and probably would not be content in a static state of perfect bliss.² It may be a dream of the past or it may be a promise of the future as in many religions: from Valhalla to the life everlasting. The conception of this after-life has undergone many changes along with the evolution of religious thought; from the dolce vita of feasting with the gods to the more sedate and passive enjoyment of rest from one’s labours. There is agreement, however, that with the threat of death removed there would be no fear of illness and in the New Jerusalem: “God shall wipe away all tears from their eyes; and there shall be no more death, neither sorrow, nor crying, neither shall there be any more pain; for the former things are passed away.”³ There is thus both a recollection and a promise of perfect health. Does it, however, remain or have to remain a mirage during men’s sojourn on earth? As long as man is mortal, he has to die, and he has to die of some cause which we would interpret as a defect in his health. Even if he “died as if falling asleep”, as in the golden age, it would be due to the degeneration of some organ. The conclusion would be that man cannot live out his life in perfect health. The nearest he may come to it would be a sudden death “as if falling asleep” and this may be as close as man can hope to approach the mirage of health. Hans Selye concludes from his experience that no one “has ever died of old age yet”.⁴ “To permit this”, he continues, “would be the ideal accomplishment of medical research”.⁵ “To die of old age would mean that all the organs of the body would be worn out proportionately, merely by having been used too long. This is never the case. We invariably die because one vital part has worn out too early in proportion to the rest of the body”.⁶ If, however, we wanted to establish, at least as a theoretical model, such a perfectly healthy life, at what age would one die then “of old age”? Would this age be the same for all and if so, would the human race be happier – and healthier – if everyone knew he would drop dead on reaching his 100th or 150th birthday, because there can be little doubt that “we could still enormously lengthen the average human lifespan by living in better harmony with natural laws”⁷ and by benefiting from future advances in medicine.

¹ Dubos, R., *ibid.*, p. 2.

² *Ibid.*, p. 235.

³ The Revelation of St. John the Devine, 21:4.

⁴ Selye, Hans, *The Stress of Life*, New York: McGraw-Hill Book Company, 1956, p. 276.

⁵ *Ibid.*

⁶ *Ibid.*

⁷ *Ibid.*

Is it the case then that we could not speak of anyone having enjoyed good health unless and until he dies of nothing but old age at the conclusion of his natural life span? "Call no man happy until he is dead", Solon is said to have cautioned King Croesus.

To follow a man throughout his lifetime to see how healthy or happy he has been, is one approach. It is an important one because only this longitudinal view-point can help us to compare the experience of successive generations or cohorts and to determine whether years added to the life span are also years of health.

Croesus, however, appeared perfectly happy at the time of his conversation with Solon, happy by all known standards. Similarly, a man may be perfectly healthy, judged by all available criteria, on a given day, though later in life or even the next day he may be struck by some disease or injury. This concept, of what may be called the point prevalence of health, is particularly useful for community studies like the present, when we are concerned with the state of health of a population at a given time.

There is, however, a connecting link between the longitudinal study of cohorts and the cross-section at a given point in time. By observing a community at a given time, we include individuals at the various stages of their lifetime so that the results will reflect both the people at the usually healthier as well as those at the usually less healthy ages.

To speak of a given point in time is largely theoretical, of course, and in practice we shall find this "point" often extended to a day, a week, a month, or even a year. Further difficulties arise when it comes to determining the criteria for good health. This will be discussed below; suffice it here to point out the obstacles to finding a simple and unequivocal answer to the simple question, how healthy are Canadians?

GOOD AND ILL HEALTH

Thinking of our aspirations as individuals, and also of examining the health services, our first aim is the preservation and maintenance of good health. Where it fails, we are concerned with caring for ill health, and this with a view toward restoring good health as quickly and as completely as possible. But although good health is the target, it is its absence and its negative manifestations that are more clearly understood and identifiable. Physician and patient note signs of illness and injury but good health, the normal state, goes largely unnoticed until something goes wrong. Health, as the saying goes, is not appreciated until sickness strikes.

Partly perhaps because good health is often taken for granted, and partly also because no serious attempt has been made in the past to scientifically define positive health and to subject it to quantitative evaluation other than through its negative aspects, we lack as yet a precise and generally accepted definition of good health as such. Reference has been made to the World Health Organization's

concept of health as something more than merely the absence of disease and infirmity. The same concept also links the physical and mental aspects of health with social well-being. The latter will be largely excluded from this study because of the emphasis here on health services. Nevertheless, the important interrelationship between the physical, mental, and social aspects of health must always be kept in mind by the health worker; social scientists, on their part, look upon health as a major component of social goals. In their search for a single and comparatively simple indicator by which to measure levels and to set standards of living, social scientists of many countries under the auspices of the United Nations have been presented with the suggestion that life expectancy at birth – a frequently used indicator of health conditions – may provide the best available single indication of levels not only of health but of living in general:

“of all the needs and values relating to levels of living, the most universal, both historically and culturally, is the desire for life itself, the fulfilment of which may be expressed by expectation of life at birth.”¹

The duration of the life span alone, however, cannot indicate how good a life it is. Per capita income has been mentioned as another possible choice of a single indicator. But when it comes to evaluating the various factors contributing to the good life or a high standard of living, it soon becomes apparent that general social well-being can only be determined in terms of values which vary greatly among individuals, population groups, and particularly different parts of the world. There is no satisfactory single indicator of levels of living and, therefore, several quantifiable or potentially quantifiable components must be taken into consideration of which health is an important one, but only one of a number which includes such factors as education, income, housing, and others reflecting economic and cultural values.²

As part of the search for general indicators of health and living conditions, the World Health Organization initiated a study into the problem of measuring the state of health in different countries. Here again the conclusion was that there existed no method of measuring health by a single indicator, but that certain components could be quantified such as life expectancy, mortality, adequacy of health personnel and facilities, and a variety of other aspects. To solve the Organization's need for a simple gauge of general health conditions in a country, the measurement of the “proportional mortality of 50 years and above” was recommended.³ This very simple measurement takes the proportion of deaths occurring at ages 50 and over as indicative of health conditions: the higher this proportion in a given country, the better its state of health. This device has considerable merit for the purpose for which it was designed but it is insufficient for an evaluation of the health status of the Canadian people. It implies, for one thing, that the ideal objective is achieved when the proportion reaches unity, that is when no one dies

¹ United Nations, Economic and Social Council, E/CN. 3/179.

² Ibid, 5/299.

³ Swaroop, S., Uemura, K., “Proportional Mortality of 50 Years and Above”, Bulletin World Health Organization No. 17, Geneva, 1957, pp. 439 – 481.

under the age of 50. This, however, may no longer be accepted as the ideal in a situation where the average age at death – not to speak of life expectancy – is well above that limit. Also, the proportional mortality at ages from 50 onwards is a function of the proportion of people in that age group. This proportion is determined partly by health conditions: the healthier the people are, the more will live beyond 50 years of age. But there are other factors which can increase or decrease the proportion of the “50 years and over” in the population, factors not related to health; among them are the birth rate and – particularly important for a country like Canada – the pattern of migration. Furthermore, any measurement relying solely on mortality reflects only the loss of life and not the loss of health.

We have long been accustomed to measuring health in terms of mortality and life expectancy, measures on which we still have to depend heavily in the interpretation of trends and changes which have occurred over the years. Yet both these measurements relate to life rather than health, and to rely on them entirely implies that health and life are synonymous. We know that *non est vivere sed valere vita* – not just being alive but being fit and strong is the real meaning of life. We have been able to extend the life span but if the added years mean largely years of chronic illness, can we still say that longer life means better health? If we are able today to keep alive babies with serious congenital malformations and people of all ages with impairments which formerly would have been fatal, is this better health? It probably is, if we think of death and disability or impairment as different degrees of ill health. By eliminating or reducing death, we are removing the most severe manifestation of illness. This may mean longer periods of sickness and impairment with a resulting greater demand on health services. On the other hand, however, the recent advances in rehabilitation techniques have led to new inroads into the consequences of disability thus compensating to some extent for the added amount of ill health resulting from the reduced mortality.

We have concluded then that the state of positive health is more than just life and more than merely the absence of disease and infirmity. It is “a full sense of physical vigor and mental well-being and maintaining a constructive and wholesome relation with others in a safe and pleasant environment that promises longevity and happiness”.¹ The attainment of this state is depicted as the highest and ultimate level of a public health service together with other social efforts after the lower levels of mortality, serious illness and minor morbidity have been conquered. As in the constitution of the World Health Organization, we find here too the thought that the state of positive health also implies the individual’s adjustment to his environment.

An operational definition of positive health thus conceived has so far eluded the experts and this renders it impossible for the time being, to measure positive health in either absolute or relative terms. Concentrating on the physical and mental well-being in the individual we are led to the concept of fitness, first in

¹ “A Broadened Spectrum of Health and Morbidity”, report of Work Party under the chairmanship of Dr. Samuel M. Wishik in the Report of the Chairman of the Technical Development Board to the Governing Council 1959-1960, in *American Journal of Public Health*, February 1961, p. 288.

its wider and general sense as "the state in which a person is able to function at his physical and mental best" as defined in Canada's Fitness and Amateur Sports Regulations. Such a state again defies measurement, however, until it can be established what the "physical and mental best" is for a person of given age, sex, height, weight, and perhaps other characteristics.¹

What can be measured though, is fitness in the more specific sense of actual performance or ability to perform but this leaves us short of our goal of measuring health:

"It is obviously incorrect to equate fitness in the 'performance' sense with general health. The discovery of the precise relations between performance capacities, specific physiological indices, and health, in its organic and functional meaning, should be the objective of concerted research efforts."²

Tests have been developed to determine physical fitness and mental aptitude. The tests and their results are in many cases interpreted as answer to the question, fitness or aptitude for what? It is generally not fitness as such that we determine, though some intelligence tests of controversial applicability attempt to measure potential rather than actual performance, the latter being reflected in the results of academic and similar tests.

Searching for a definition of positive mental health, Tucker and leRiche suggest that in an adult individual it "may consist of his possessing insight into his personality, combined with an honest recognition and acceptance of its condition."³ The authors emphasize, however, that this definition still leaves the concept of positive mental health in a fog, thus defying clear perception and measurement. But they add: "we have no basis for the belief that because a thing escapes definition, it has no reality."⁴ The Canadian Medical Association terms the article "a significant contribution towards the process of identification and definition which is an essential prerequisite to further research"⁵ and adds that as with physical health, mental health also is something more, containing some "plus values", than just the absence of disease or infirmity.⁶ The concept of mental health, however, is still less static and more gradual than that of physical health.

Physical and mental function manifest themselves in a number of ways. One way of measurement is by a profile, grouping such manifestations into several classes. The PULHEMS system developed by the Canadian medical services in

¹ A most useful source of reference material is provided by the Detrimention Centre of Fitness and Recreation at the University of Ottawa.

² Fleishman, E.A., *The Structure and Measurement of Physical Fitness*, Englewood Cliffs, N.J.: Prentice-Hall Inc., 1964, p. 154.

³ Tucker, D.K., leRiche, Wilt., "Mental Health: The Search for a Definition", *Canadian Medical Association Journal*, May 16, 1964, p. 1165.

⁴ *Ibid.*, p. 1160.

⁵ "Positive Mental Health", editorial, *Canadian Medical Association Journal*, July 25, 1964, p. 181.

⁶ *Ibid.*

the armed forces¹ constitutes such a profile for the medical grading of bodily and mental function. Its very purpose, however, of providing the criteria for judging the fitness among a selected population group for military service implies its limitations although the system may well lend itself to wider application among different population groups. In explaining the system, it has been stated that "such a profile gives very little information concerning the individual's state of health or physical condition but does reveal, factor by factor, his functional capacity."² Related to a detailed list of job specifications in the military service, the PULHEMS system provides for each factor "a graph of the soldier's ability to work at set levels of performance".³ The factors, or components of the system, are briefly described as follows:⁴

- P Physique – This includes development, height and weight, his potential capacity to acquire physical stamina with training. It is his capacity for work. Under P is included the Cardio-Vascular System, Respiratory System, Digestive System, Neurological System (organic), Integumentary System.
- U Upper Extremities – Functional use of hands, arms, shoulder, girdle and upper spine.
- L Lower Extremities – Functional use of feet, legs, pelvis and lower spine.
- H Ears and Hearing
- E Eyes and Eyesight
- M Mental Capacity – Intelligence
- S Stability

There are five grades under each factor, indicated by figures so that grades 1 to 5 embody the whole range of physical fitness, grade one being the best.⁵ This provides a wide range of gradients between the completely normal function in all respects and total disability – for military work – in all respects. The many possible combinations of scores have been interpreted by the armed forces in terms of their application to a great variety of jobs in various situations. The PULHEMS grading contains a high degree of absoluteness and can be determined without regard to a specific type of work. A particular job, through its detailed description, can then be matched with a particular PULHEMS profile. The complete profile also contains the age.

Elaborating on the PULHEMS system, Willis and Kalant contend that the usefulness of the PULHEMS system in the armed forces would make it seem likely

¹ And adopted with minor modifications by British, United States and other armed forces.

² *Official History of the Canadian Medical Services 1939-1945*, Feasby, W.R., ed., Ottawa: Queen's Printer, 1956, p. 501.

³ Ibid.

⁴ Ibid.

⁵ Ibid.

“that a similar system would prove worthwhile in civilian practice and especially in grading men and women for industry.”¹ For the broader purpose of use in civilian practice an extension of the seven categories of the PULHEMS into 15 categories was suggested, in addition to the year of birth. When discussing his idea later, Dr. Willis said he also considered extending the grades under each category from five to ten to render the whole system more sensitive.

In the armed forces the system applies only to the age groups where function can be expected to be at the maximum. With progressive age, at least some of the physical functions must be expected to decline. This could be taken into consideration in a profile like the PULHEMS so that a man with some lower grades would still be considered fit in terms of the level appropriate to his age. There may be greater conceptual difficulties at the opposite extreme of the age scale, the developing child and youth.

All these problems indicate the need for further study before a profile of the kind discussed can be adopted for the absolute measurement of health or fitness rather than for specific purposes only.

Dunn developed the concept of “high-level wellness” which he defines as “an integral method of functioning which is oriented toward maximizing the potential of which the individual is capable, within the environment where he is functioning”.² This concept has been under study by the Subcommittee on Quantification of Wellness, of the United States National Committee on Vital and Health Statistics. The Subcommittee has been looking into the possibility of developing a score under several category headings but so far, it seems, without success.

The Canadian program for fitness and amateur sports also is concerned with the concept and measurement of fitness. The need for quantifying and measuring fitness has been recognized and studies are underway towards this objective. There is hope that the various inquiries into the physiological nature of the body and new techniques of its measurement will yield some of the answers.

Until these answers are found, we have to resign ourselves to the conclusion reached by the study group on the Measurement of Levels of Health, established by the World Health Organization. The Group “considered the need for direct measurement of health but recognized that, in the light of available statistical information, only deviations from health are susceptible to measurement.”³ The report continues, however, by emphasizing “That a special effort should be directed to planning further studies”⁴ on the subject of a direct measurement of health. But for the time being we must be content with measuring health in terms of its negative aspects.

¹ Willis, J.S., Kalant, H., “A Medical Grading Code”, Canadian Medical Association Journal, November 1946, p. 510.

² Dunn, H.L., “What High-Level Wellness Means”, Canadian Journal of Public Health, November 1959, pp. 447-457.

³ Measurement of Levels of Health, report of a Study Group, World Health Organization, Technical Report Series No. 137, Geneva, 1957, p. 15.

⁴ Ibid.

THE EPIDEMIOLOGY OF HEALTH

If epidemiological study is necessary to discover the etiology of disease and to evaluate methods of prevention and treatment, the same should apply to the study of health. Just as the knowledge of the distribution of a disease and of the characteristics of patients yields valuable knowledge of the possible causes of diseases, so can the study of healthy people and their circumstances lead to an understanding of the relationship between these circumstances and health. This, however, is a largely unexplored field, one of the reasons being the difficulty of the conceptual definition and practical diagnosis of positive health. We have already observed the distinction between the longitudinal approach of assessing health during a person's entire lifetime, and examining someone's health at a particular point in time. Both these approaches are probably needed for different purposes, and in both respects much remains to be done to obtain conclusive evidence.

To consider people as healthy as long as they are not aware of being ill, is not a satisfactory approach. There may be asymptomatic illness present or unawareness of existing symptoms, and furthermore we have defined positive health as something more than just the absence of illness. With this limitation in mind, it may nevertheless be worthwhile to consider the various sickness surveys and analyse the group which reported no sickness. As an example, the following are some findings which can be deduced from the Canadian Sickness Survey 1950-1951.¹ This survey, it must be remembered, covers the experience of Canadians generally during the survey year only.

On an average day during the survey year – and this included an influenza epidemic in 1951 – about 85 per cent of the population reported no sickness, not even minor complaints. Distributed by age and sex, the picture is as follows:

| Per Cent of Population Reporting No Illness on an Average Day | | | |
|--|-----------------|-----------|-------------|
| Age | Both Sexes % | Male % | Female % |
| All ages | 85.7 | 87.6 | 83.8 |
| Under 15..... | 90.3 | 90.5 | 90.1 |
| 15 – 24..... | 91.3 | 92.5 | 90.2 |
| 25 – 44..... | 85.2 | 88.5 | 82.0 |
| 45 – 64..... | 80.4 | 83.2 | 77.4 |
| 65 and over | 71.2 | 74.1 | 68.3 |

This was the situation on one day. With increased length of time, the likelihood of becoming sick also increases. Hence, the percentages of people remaining without any apparent trouble or defect throughout the year is considerably smaller:

¹ Department of National Health and Welfare and Dominion Bureau of Statistics, *Illness and Health Care in Canada – Canadian Sickness Survey 1950-51*, Ottawa: Queen's Printer, 1960, passatim.

| Per Cent of Population Reporting No Illness during Year | | | |
|---|-----------------|-----------|-------------|
| Age | Both Sexes % | Male % | Female % |
| All ages..... | 19.6 | 22.3 | 16.9 |
| Under 15..... | 12.7 | 12.7 | 12.6 |
| 15 – 24..... | 27.2 | 30.7 | 23.8 |
| 25 – 44..... | 20.1 | 25.3 | 15.0 |
| 45 – 64..... | 23.6 | 26.6 | 20.5 |
| 65 and over | 20.4 | 22.4 | 18.3 |

It should be noted that the figures for females in the childbearing age groups reflect not only illness but also conditions related to childbirth which were counted as “illnesses”. The young adult group aged 15-24 emerges as the healthiest.

The over-all percentage of 85.7 being without complaint on any given day, is reduced to 19.6 over the period of one year. If it were extended over a lifetime, it would be reduced to zero because everyone experiences at least a terminal illness and very likely some minor disorders before that. But again we face the question of the concept of positive or good health: does, for instance, a slight cold or a minor injury preclude a person from being considered as healthy?

The very fact that the survey found 85 per cent of the population without any health complaint on a given day indicates that even if this figure does not accurately reflect the healthy population, a substantial proportion of people carry on without suffering ill health. We are inclined to associate sickness, particularly chronic illness, with old age but even in the age group 65 and over, the survey found some 70 per cent apparently healthy on any day, and 20 per cent living through the year without known illness. These are encouraging signs which indicate that illness is far from inevitable even at the most vulnerable ages and that there is a place for services directed towards health maintenance, prevention of illness, and rehabilitation where sickness has occurred.

HEALTH AS THE ABSENCE OF DISEASE OR INFIRMITY

For purposes of a quantitative evaluation of the health status of a people, as of an individual, our concept of health is based on the presence or absence of health defects.

Health defects may present themselves as physical or mental disease, injury, or health impairment, all of which fall under the general term “morbidity”. Morbidity in these terms is a state of health below a given norm. It is at once apparent that the criteria for the norm as well as for the deviations from it may be either objective or subjective in nature. Objective criteria for the norm, that is health or fitness, may be of the nature described above in terms of fitness standards required for certain tasks. The existence of health defects can generally be determined beyond reasonable doubt based on medical knowledge and experience. But the accuracy and correctness of the medical diagnosis is itself

subject in many cases to physician's training, the availability of modern diagnostic equipment, and the special knowledge required to interpret the findings. There are other obstacles to a reliable and objective measurement of morbidity.

Morbidity manifests itself in many ways and in an infinite range of severity, from very slight discomfort and minor symptoms to severe illness, until the climax of severity, namely death, is reached. The transition from health to ill health is often a gradual one and hence the decision where one state ends and the other begins may be difficult. The awareness of such minor manifestations or of the first onset of illness is subject to the patient's attitude towards his health or illness. The same symptom may affect different people in different ways and a headache keeping one person from following his usual activity may go unnoticed by another.¹

While the onset and even the presence of disease are often very subtle and difficult to determine, the event of death is always clear cut and can be established beyond doubt. This is one reason why measurements of mortality have remained the most reliable indicators of health conditions. That they no longer continue as the only such indicators is discussed in Chapter 3.

CONCLUSIONS

"Explanations take such a dreadful time", comments the Gryphon to Alice in Wonderland. And at the end of this chapter we find ourselves still where we started out, namely concluding:

- 1) that besides physical and mental well-being health also implies social adjustment,
- 2) that even if we try to omit questions of social adjustment from our inquiry, we find that the physical and particularly the mental aspects of health cannot be separated entirely from social and environmental influences,
- 3) that there is such a thing as positive health which is more than merely the absence of illness,
- 4) that as yet we lack a means of directly measuring in quantitative terms positive health so that for the time being we must be content with measuring health defects rather than health as such.

This explanation may, however, serve the purpose not only of making it clear why there is no simple answer to the question, "how healthy are Canadians?", but also of pointing out directions in which research is being conducted and more knowledge needed. It should also be a reminder that in the planning and operation of health services the objective must be not only to treat illness but primarily to promote good health and its maintenance, and to prevent where possible its negative manifestations from occurring. This can be overlooked too easily precisely

¹ The Canadian Sickness Survey 1950-51 showed persons in Newfoundland reporting proportionally fewer minor illnesses than people in British Columbia. There may have been a variety of reasons for this but one possible explanation may perhaps be found in a different attitude by residents of Newfoundland to what they consider an adequate state of health as compared with the attitudes in British Columbia.

because illness and death are more spectacular and specifically definable so that specific health services can be applied to control them. The promotion and maintenance of positive health, on the other hand, must benefit from all the fruits of modern scientific knowledge of the body and mind, but it achieves its goals only partly through health services, and very largely through habits and activities promoting the general fitness and well-being we have briefly described.

Because health and life are so closely interrelated, and because health problems vary with the characteristics, condition, and environment of the people, it will be well to begin the inquiry into the health status with a brief review of the people and their environment.

The traditional emphasis on mortality as reflecting ill health, and the life span as indicating a desirable state of health lead to a general appraisal of health trends in terms of general mortality and life expectancy, to be followed by a review of specific disease groups and their impact.

THE PEOPLE, THEIR CHANGING CIRCUMSTANCES, AND THE WORLD AROUND THEM

“No single factor, such as public health activity, can be considered alone in relation to population change, as if it existed in a social and historical vacuum. Indeed, an exceedingly complex series of interrelationships is involved in the dynamics of population growth, stability or retrogression.”

Hanlon, John J. -- The Public Health Worker and the Population Question

Regardless of our definition of health, it is clear that life and health are man's basic determinants and, therefore, interrelated to all his other characteristics, his actions, and his role in the community. Standards of living and hygiene which have a very direct bearing on health are very largely the outcome of social and economic conditions, all tied closely also to educational standards, changing knowledge and attitudes, and such political conditions as war or peace. In addition, the general advance of scientific knowledge and its application affect the condition of the people.

In many instances of specific diseases and injuries, or groups thereof, reference will be made to the relationship between the clinical phenomenon and man's social characteristics as well as his social and physical environment. It will also be observed that a stage can be reached in the provision of health care where continued results can be expected only from a parallel development of social measures -- such as urban renewal, the alleviation of individual cases of poverty, the development of northern communities -- or from changing behaviour -- such as accident prevention, reduced smoking or use of alcohol -- and such public health measures as the control of air and water pollution. While certain factors in the environment or conduct of people may create specific health hazards, e.g., cancer of the lung, the effect is less specific in regard to other factors. Thus, poverty, malnutrition, and overcrowding are associated with a high incidence of not one or two but of a host of diseases, just as air pollution and tobacco produce excess morbidity and mortality not merely from lung cancer but also from cardiovascular disease and respiratory infections.¹

To study people's health in the context of their demographic and social characteristics is not merely a prerequisite to a better understanding of cause and

¹ Clausen, J.A., "Social Factors in Disease", *The Annals of the American Academy of Political and Social Science*, March 1963, p. 141.

effect relationships but it can also help in the prevention and control of disease. Margaret Mead refers, for instance, to religious beliefs and cultural values as shaping attitudes towards health. She points out that if the individual is conceived as having only one meaningful existence, vigor and longevity become paramount values. The attitude towards infant deaths will depend on whether a stay on earth, however brief, is regarded as a first step to heaven or as the newborn's only chance to be a person. Similarly the relative value placed on a human being will determine the priority given to the needs of mother or child in an obstetrical emergency.¹ Awareness of such cultural determinants involving knowledge of region, class, occupation, ethnic origin, religion, and even politics can effectively guide health educational programmes.²

The rapid and spectacular developments of recent decades in all fields of the natural and social sciences have been increasing the volume of knowledge in these areas to such an extent that only by progressive specialization can experts master the body of available knowledge. This has also brought about a growing complexity of social institutions, and the result has been the fragmentation of scientific inquiry and proliferation of agencies concerned with the various aspects of individual and social activity. Parallel with this ramification of inquiry and effort, however, has developed a growing awareness of man's well-being as an entity whose many components are closely interrelated and also interdependent. Regardless of whether we consider health as the sum total of well-being or only its physical and mental components, all the other factors are important and have their effect on, or in turn are affected by, health conditions in the narrower sense. Man's health and behaviour "is dependent upon the life history of the encounter with his society and culture which has already transformed him"³ and, we may add, will continue to transform him.

Conversely, health and disease are decisive factors in determining cycles of civilizations, the fortunes of nations, and the contributions to mankind by its great personalities. The political and military history abounds with examples of disease as the decisive or a major contributing factor in the destruction of armies and empires.⁴ If we are told that malaria was one of the chief causes of the decline of ancient Greece and Rome⁵ and may have caused the death of Alexander the Great, it is well to remind ourselves that in modern times this disease plagued the builders of the Panama Canal as well as the crews of Colonel By, building the Rideau Canal. If malaria, yellow fever, smallpox, the plague, or scurvy played havoc with armies in ages past, we must recognize that these diseases -- still rampant in

¹ Mead, M., "Determinants of Health Beliefs and Behavior - Cultural Determinants", *American Journal of Public Health*, October 1961, p. 1552.

² *Ibid.*, p. 1554.

³ Stainbrook, E., "Man and His Changing Environment - Health and Disease and the Changing Social and Cultural Environment of Man", *American Journal of Public Health*, July 1961, p. 1006.

⁴ See Dubos, R., *op. cit.*, pp. 190-197.

⁵ Huxley, J., *Man in the Modern World*, New American Library, New York, 1951, p. 66.

large areas of the world - - have the same destructive effect on the labour force which is at least equally important as the armies to the survival and progress of nations. History, however, is not merely a simple sequence of facts, each with its clear cause and effect relationship, and some historians disagree with the theory that it was diseases like malaria which brought about the downfall of Greece and Rome. Toynbee's interpretation reverses the sequence of events and sees the marshes breeding the anopheles mosquito as a consequence of declining civilizations, both in the east and west, and the disintegration of irrigation systems and cultivation in general: "the loss of command over the environment".¹ Rommel's army in Africa was probably not defeated by either an epidemic of infectious hepatitis, or superior strategy, or greater power and better equipment, but by a unique combination of these factors. We need not, however, oversimplify the chain of historic events in order to illustrate the impact which disease can have on the life of a nation as on that of an individual. The extent to which malaria, yellow fever, and other diseases sap the strength of a people and, on the other hand, the improvements brought about by the control and eradication of these diseases, have been observed and studied in modern times and striking implications demonstrated.²

The interrelationship between the political, social, and economic state of the nation and its health status permeates all aspects and phases of the life of the community, of which the following pages can give but a few examples. The relationship applies to the numerical size of the population, its demographic characteristics, its social and economic attributes, as well as to the natural and man-made environmental factors affecting it.

THE PEOPLE

Numeri

The number of people, i.e., the size of the population, has always been a matter of the greatest concern to governments at all levels. It is the number of people which determines the strength of armies, the size of the labour force, the number of mouths to feed, and the taxes to be levied. Moses found it necessary to count his people as a prerequisite to transforming them from an amorphous mass of wandering nomads into a tightly organized, strong, and effective community: he had to know of the twenty-year old and upward ("all that are able to go forth to war in Israel") and of those from thirty years old and upward even until fifty years old to provide the labour force for community projects such as the work in the tabernacle of the congregation.³ When Marco Polo, in the 13th century, reached the splendid and magnificent city of Kinsai (Hangchow), he found there that the great Kublai Khan's commissioners received annual reports of the revenue and number of

¹ Toynbee, A. J., *A Study of History*, abridgement by D.C. Somervell, London: Oxford University Press, 1947, Chapter XV.

² See for example: Winslow, C.E.A., *The Cost of Sickness and the Price of Health*, Geneva: World Health Organization, 1951.

³ Old Testament, Numbers, Chapter 1-4.

inhabitants.¹ And Halley saw "the Strength and Glory of a King being in the multitude of his Subjects."²

Gradually, the number of people came to mean to governments not merely armed strength and a source of revenue for the coffers of the ruler and the maintenance of armies, but also the object of services such as education, housing, transportation, and the wide range of community services - including health services - which modern public and private agencies provide.

Our complex modern society has to plan all its activities based on the size of the population and its various segments: censuses, intercensal estimates, estimates based on tax rolls and other criteria, and population projections are designed to supply the planners and administrators with this essential information.

The size of the population and the factors responsible for its growth or decline bear some important relationship to the health status of the population. We shall concern ourselves here merely with establishing and pointing out some of these relationships without necessarily probing into the question of whether they are for better or for worse. Malthus looked upon disease and resulting mortality as positive checks which were necessary where the preventive check by the diminution of births failed to halt the runaway population increase. In Canada today, however, we have a vague idea that we need a larger population, just as we think of some areas in southeast Asia as overpopulated, but without having yet found a way to determine what the desirable or ideal size of the population would be even under present conditions, let alone attempting to forecast what it might be at some time in the future.

The health aspects can be discussed only in relation to the various components accounting for population changes, but in order to view these in their proper perspective it may be well to retain a general picture of Canada's population movement: a steady though often uneven growth.

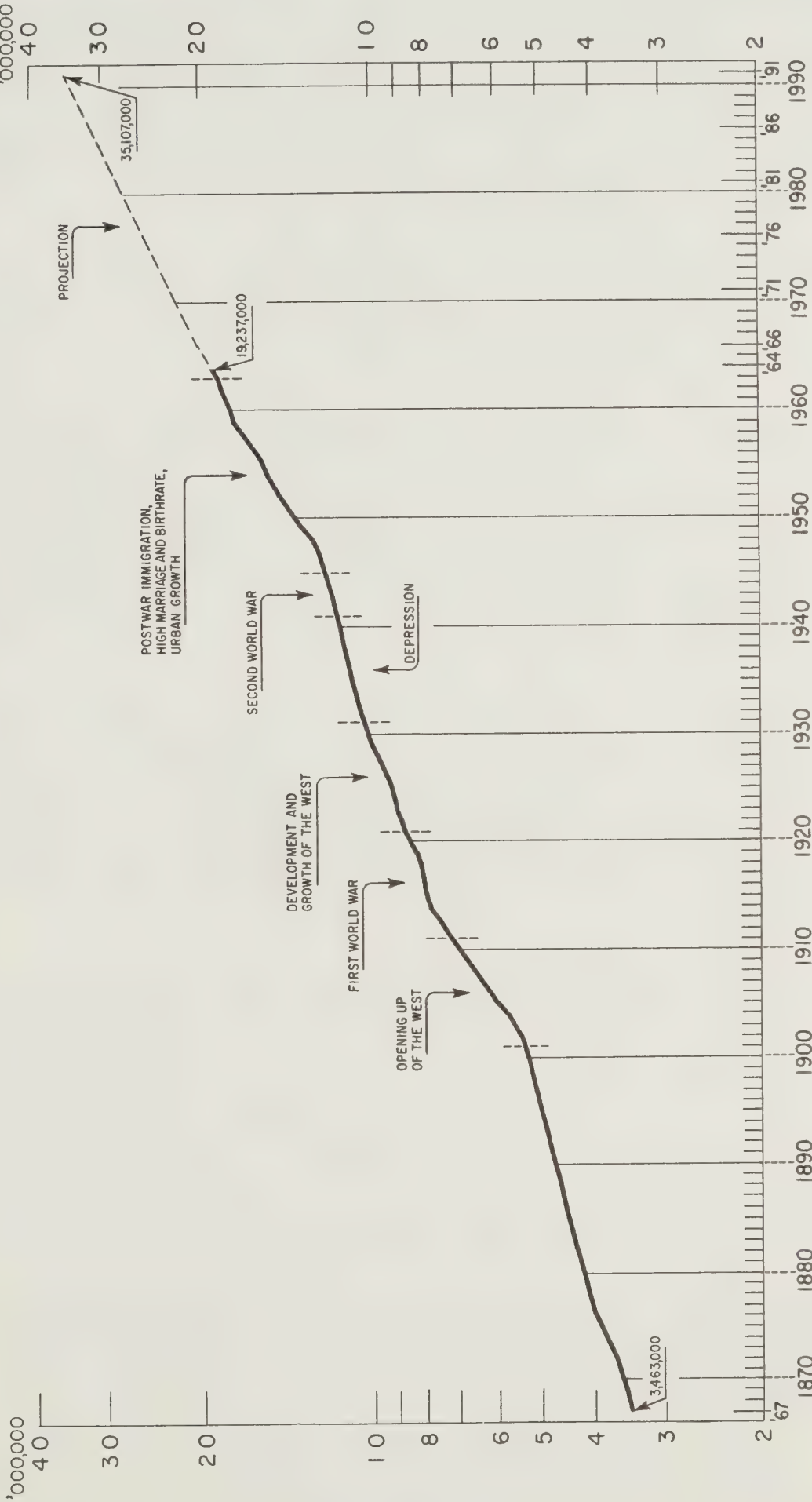
Figure 1 depicts this growth from Confederation to date, as well as the projected growth until 1991. It is a continuous upward trend but with an uneven rate of growth. The unevenness often coincides with, and can be explained by social, political, and economic events. The growing size of the population means more lives, determined by the number of births and deaths (the natural increase) and also by the entry of immigrants and the exit of emigrants (net migration).

¹ As far as knowing the number of people is concerned, the Great Khan's administration was way ahead of our quinquennial Censuses and intercensal estimates. He had exact figures available at all times. "Every father, or head of a household, is required to list on the door of his house the names of each member of his family, as well as the number of his horses. When any person dies, or leaves the dwelling, the name is struck out; similarly, when anyone is born, the name is added to the list. Thus the authorities know at all times the exact number of inhabitants. The same practice is followed throughout the province of Cathay as well as Manzi (The Travels of Marco Polo, New York: The New American Library, 1961, p. 220).

² Halley, E., "Degrees of Mortality of Mankind, II - Some further considerations on the Breslaw bills of Mortality", *Philosophical Transactions of the Royal Society of London*, 1693, p. 656.

FIGURE -- I

GROWTH OF CANADA'S POPULATION
1867-1991



Source: see Table I Appendix C.

In 1867 Canada embarked upon the path of nationhood with a population of about 3,463,000. That is less than one-fifth of her present population and about half the population of the Province of Ontario today. The fivefold increase in potential patients and the technological developments in the medical and allied sciences explain the infinitely greater complexity of today's health services compared with those in existence at the time of the birth of our nation. This process can be expected to continue, if not accelerate, from a population of some 19 million today to the projected 35 million in 1991.

Almost double the population in thirty years' time will mean twice as many sick people and hence double the need for services -- if the patterns of disease and care remain what they are today. The impact of the growth of the population in the various health fields will be discussed more fully under the respective headings.

To assume that health and health services will present essentially the same problems in the future as they do today is, of course, wrong; we know that they are not likely to remain unchanged, but we cannot predict in what way they may be affected by yet unknown factors except for certain trends already discernible. At the time of Confederation the main health problems were the dread epidemics of cholera, typhus fever, smallpox and other diseases either unheard of today, or controlled to such an extent that one case brought into the country immediately sets a coast-to-coast alarm system in operation.

The growth of the population has not been uniform over time, nor has it been evenly distributed among the provinces. As one would expect in a young country generally considered to be underpopulated, the record has been one of continuous growth. The projections indicate that this will continue for a long time to come. There are two factors involved in determining this growth: one is the natural increase and the other migration. The latter, in a country like Canada, is largely a matter of immigration.

The natural increase is the result of people being added to the population by birth, and others taken away every year by death. The magnitude of these two factors is measured in terms of the birth and death rates respectively. Neither of these varies too abruptly. The death rate shows a general and steady decline. The birth rate, subject as it is to social and economic conditions and attitudes, shows definite fluctuations (e.g., a low during the depression years) but these changes are not abrupt. As a result, the natural increase of the population presents a relatively smooth movement and accordingly, projections of this component of the population increase are not likely to be too far off the mark even for several decades.

The opposite is true of the migration component of population changes. What matters here, from the demographic point of view, is the net migration which is the result of migration after the compensating factors of immigration and emigration have been cancelled out. Emigration from Canada is largely directed towards the United States. While this trend will be affected by economic conditions on both sides of the 49th parallel, and is likely to change with greater opportunities becoming available in Canada, there is not likely to be a sudden substantial change.

Immigration into Canada, on the other hand, can be expected to continue in an erratic and unpredictable fashion. The number of immigrants admitted to Canada depends on the economic and social conditions here which in turn determine immigration policies. It also depends in no small measure on the political, economic, and social conditions in the countries of origin, i.e., areas as far remote from Canada's shores as Hong Kong and Hungary. The economic developments in Europe and the United Kingdom are modifying the stream of immigrants from these areas.

The contributions to the population growth by these two components – natural increase and net migration -- are shown in Figure 2. It contrasts the fairly smooth and hence more predictable trend on the natural demographic component of population growth with the rather erratic fluctuations of the migration factor.

The natural increase, representing the autochthonous demographic factors, is calculated from the number of births and deaths occurring in Canada. It is arrived at by subtracting the number of deaths from the number of births in a given year, and is strongly affected by health conditions. The number of deaths clearly is the direct result of the circumstances causing these deaths, i.e., diseases or injuries, both manifestations of ill health. The behaviour of the death rates in Canada and elsewhere will be more fully discussed later, but in pointing out the relationship between health and mortality it should be noted that a higher crude mortality rate does not necessarily mean worsening health conditions because it may be due to the progressive aging of the population as a result of better health.

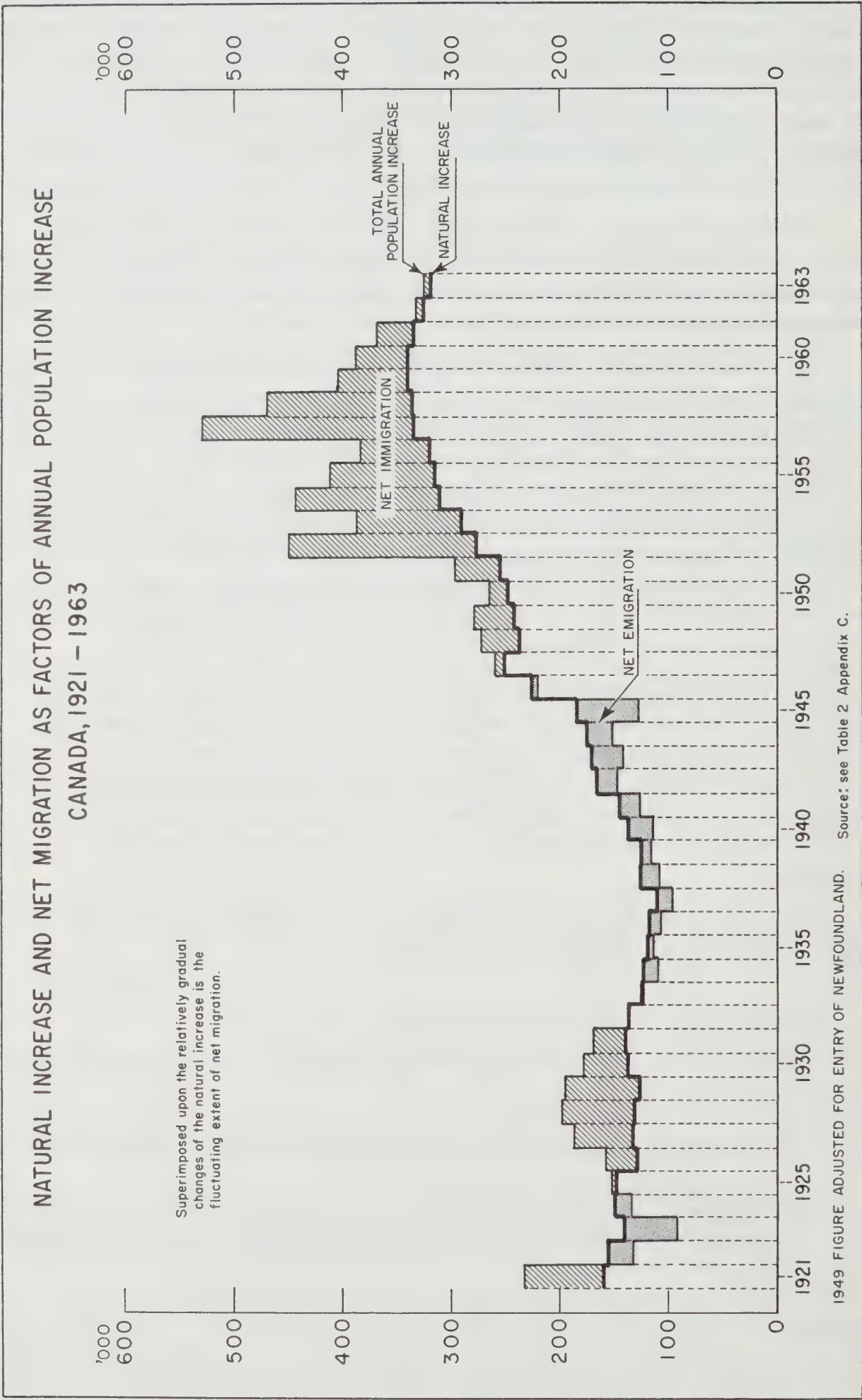
The other component of the natural increase, the birth rate, is influenced largely by social factors, including marriage patterns. But it is also susceptible to changing health conditions. Everything else being equal, the effective birth rate, that is the number of live-born children per 1,000 population, increases with a reduction in fetal deaths and still-births. Also, fertility rates can be adversely affected by certain unfavourable health conditions among men and women in the relevant age groups.

Hanlon sums up the effects of improved public health on the growth of a population by identifying the following four factors:

- “(1) by improving the chances of fruitful conception;
- (2) by greatly increasing the chances of survival among infants and young children;
- (3) by preventing the premature deaths of many young adults who represent the most fertile component of our population and the group with the longest period of future fecundity;
- (4) by greatly reducing the number of marriages dissolved by the death of one partner. This has allowed a longer average period of effective married life.”¹

¹ Hanlon, J.J., “The Public Health Worker and the Population Question”, *American Journal of Public Health*, November 1956, p. 1400.

FIGURE — 2



The health status of the population thus has an undeniable effect on the rate of growth of Canada's population. Conversely, the number of people determines the extent of the various health problems in the community and hence the need and demand for health services. The knowledge of the present as well as the projected population size is, therefore, an important tool for the planner.

The nature of health problems and of services needed varies considerably with the age and sex of the individual, as will be illustrated later, and for this reason the age and sex composition of a population, and its trends, has significant implications for those concerned with the health of the community.

The Old and the Young, Men and Women

The age distribution of the population determines, as stated above, the extent of health problems characteristic of the various age groups. On the other hand, it is their health which determines how many people survive into successive age groups.

Certain health problems are common to members of either sex but many others have a different impact on men and women, and boys and girls. The distribution of boys and girls born into this world, however, is removed from man's interference and manipulation.

Having observed the past and likely future movement of population, it is equally important to the health worker to be aware of the trends in the age and sex distribution of the population over time: "Since the pattern of illness and injury varies strikingly with age and sex, the structure of a population with regard to these two characteristics will bear upon its medical care and public health programs".¹ Health planners have been particularly concerned with the growing impact of chronic disease in an aging population.

But to what extent is Canada's population aging? The answer depends on the way one looks at it. The following charts will make that clear. The age distribution has been simplified here - perhaps over-simplified - by reducing the observations to three broad age groups: 0-14 years (children); 15-64 years (students and labour force); and 65 and over (the retired).² Needless to say, these three age groups are far from homogeneous and for many purposes analysis by smaller age groups will be necessary.

When we speak of an aging population, the implication is that the proportion of the older people increases. Figure 3 shows to what extent this is the case and what proportional changes have occurred and can be anticipated in successive Census years since the turn of the century. There has been a slow but almost steady

¹ Spiegelman, M., *The Changing Demographic Spectrum and Its Implications for Health*, presented before the Eastern States Health Education Conference, New York Academy of Medicine, April 26, 1962, p. 4.

² Unfortunately often held to be synonymous with "old" or "aged". This is unfortunate because on the one hand, many in that age group are not physiologically old, and, on the other hand, it often obscures the fact that chronic diseases usually attributed to old age often have their onset at younger ages at which time prevention, study, and care should be initiated without waiting until the person has reached the chronological "old age".

increase in the proportion of people aged 65 and over. From 1901 to 1961 it has risen from 5.0 per cent to 7.6 per cent. Although this constitutes approximately a 50 per cent increase over the six decades, the total percentage accounted for by this age group still remains small enough so that the increase actually has only little effect on the proportions of the other two age groups. Between 1961 and 1991 the percentages are expected to rise from 7.6 to 8.9, a lower rate of increase than that for the previous thirty years. And again, the proportion of this age group will remain small enough in comparison with that of children and people in the working ages, that the 17 per cent increase in its proportion from 1961 to 1991 will mean only a 1.4 per cent decline in the proportion of the other two age groups taken together.

It must be noted, however, that these projections are based on an assumed annual net immigration of 50,000 during the 1961 to 1991 period. Immigrants being predominantly younger people, any deviation from the estimated number of migrants will affect the age structure of the population. Figure 4 demonstrates this by comparing the percentages accounted for by the older age group in 1961 and 1991, assuming net immigrations of zero, 50,000 (as used above), and 100,000. The respective percentages in 1991 would be:¹

| <u>Net Immigration</u> | <u>Percentage of Total Population in 1991</u> |
|------------------------|---|
| 0 | 9.3 |
| 50,000 | 8.9 |
| 100,000 | 8.2 |

Percentage-wise, the alternative assumptions still alter only slightly the proportion of people in the remaining age groups. Apart from changing migration patterns, however, any substantial but unforeseeable deviations from the projected birth and death rate would also affect the age structure of the population.

An aging of the population affects not only the pattern of health problems, but it has also important social and economic implications which, however, remain peripheral to this study. Nevertheless, lest the existing and projected level of aging in Canada should be viewed with concern, it will be well to keep in mind that the process of aging in the population is accompanied by a growing economic output, and also that the percentage of older people is higher in many other countries than it is in Canada. Examples are the following European countries which because of lesser immigration and lower birth rates have a higher proportion of their population in the age group 65 and over.²

| <u>Country</u> | <u>Proportion of Population 65 and Over (1961)</u> |
|------------------------|--|
| | <u>%</u> |
| Canada..... | 7.6 |
| England and Wales..... | 11.9 |
| France..... | 12.1 |
| Sweden..... | 11.9 |
| West Germany..... | 10.6 |

¹ Stukel, A., "Population Projections 1966-1991", Appendix E, in Brown, T.M., Canadian Economic Growth, a study prepared for the Royal Commission on Health Services, Ottawa: Queen's Printer, 1964.

² Based on: United Nations, Demographic Yearbook 1962, New York, 1963, passim.

FIGURE — 3

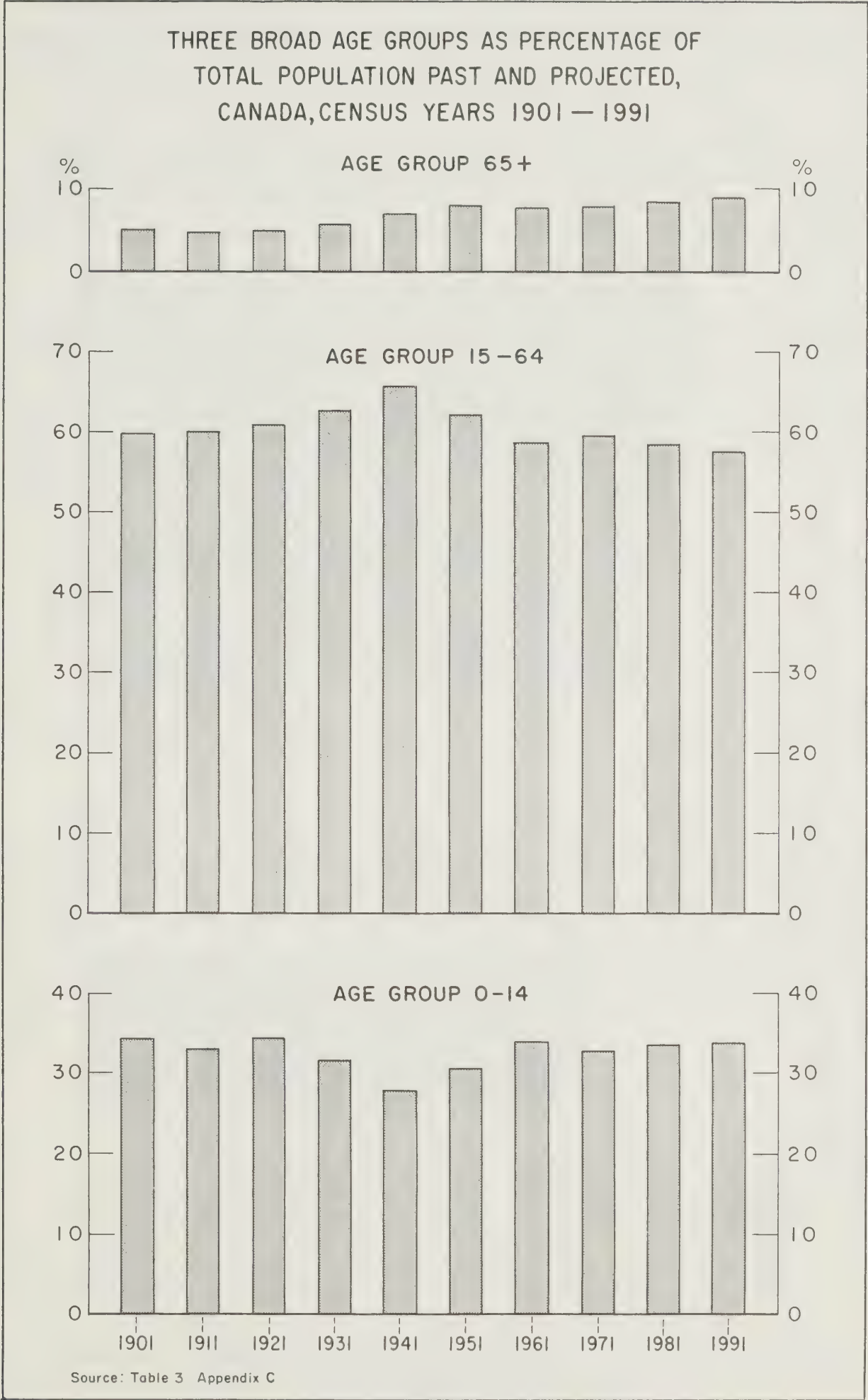
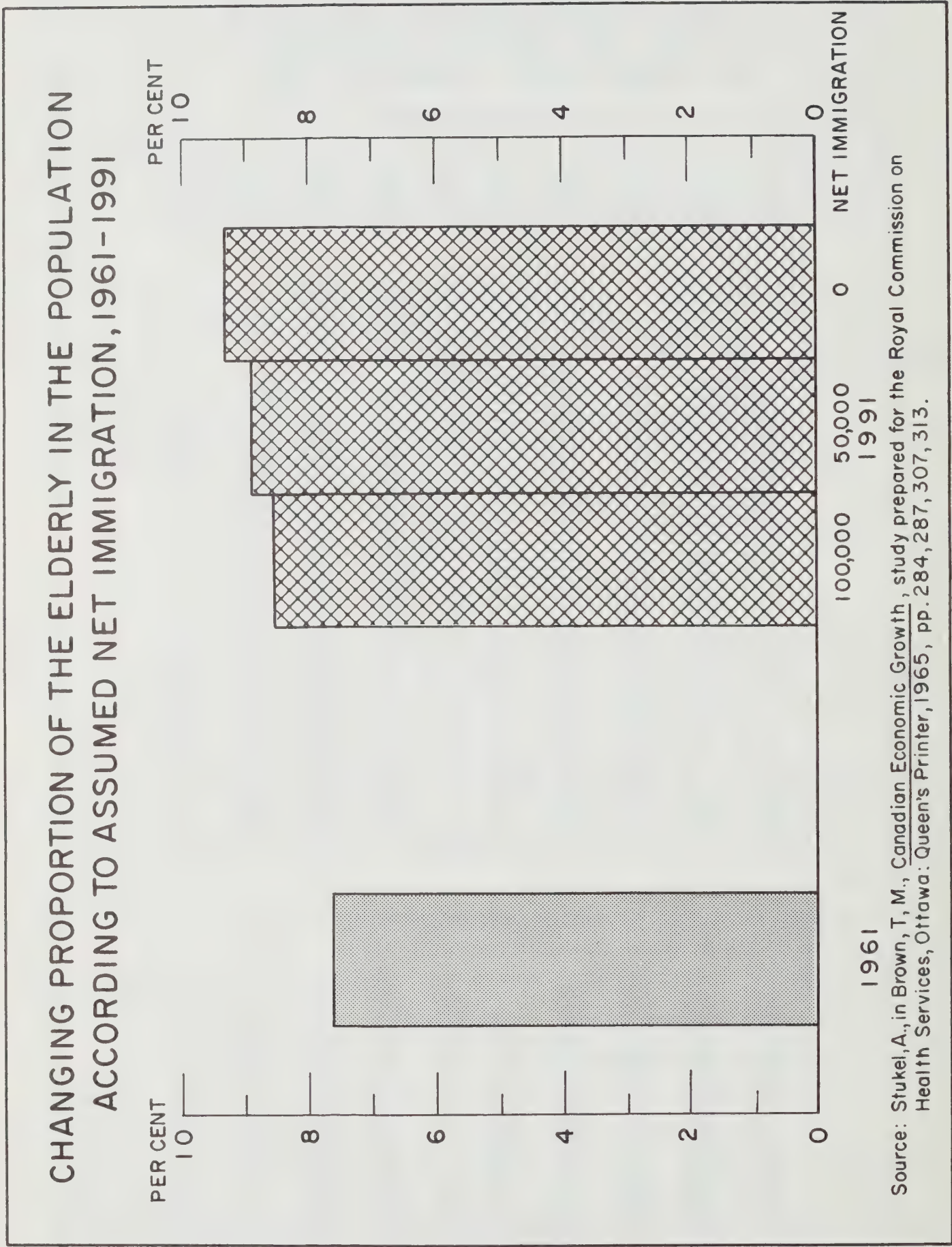


FIGURE 4



The proportional changes, while highly significant to the social and economic planner, tell the health worker little about the extent of the various health problems he will encounter. They do give him valuable insight, however, into the demographic consequences of changing fertility, birth rates, and death rates.

In order to be able to interpret the population movement in terms of his potential case load, the health worker is concerned with the actual number of people at risk in regard to the health hazards of various age groups. Looking at the actual numbers of older people and those in the other age groups, we find a general increase in each age group resulting, of course, from the continuous increase of the population as a whole. Among the age group of 65 and over, the number of people has increased from 1951 to 1961 by some 300,000. This increase will be stepped up to 400,000 between 1961 and 1971; 600,000 between 1971 and 1981; and over 700,000 between 1981 and 1991. In the thirty-year period from 1961 to 1991, the total number of people in this older age group is expected to more than double from 1.4 million to 3.1 million, as shown in the following tabulation, together with those in the other age groups:

| Year | 0-14 | 15-64 | 65 and Over |
|-----------|------|-------------|-------------|
| | | ('000,000) | |
| 1961..... | 6.2 | 10.7 | 1.4 |
| 1971..... | 7.4 | 13.4 | 1.8 |
| 1981..... | 9.4 | 16.4 | 2.4 |
| 1991..... | 11.8 | 20.1 | 3.1 |

Source: Table 3 (Appendix C).

The number of males slightly exceeded that of females fairly uniformly in all age groups at the turn of the century; the females accounted for about 49 per cent in each group. In the age groups 0 - 14 and 15 - 64 the percentage was about the same in 1961, but in the 65 and over group the 1961 Census was the first to show an excess of females over males, the former accounting for 51.5 per cent. This percentage can be expected to increase to 57 by 1991, whereas the females will retain their narrow minority in the younger age groups, as shown below:

| Year | Percentage of Females in Age Group | | |
|-----------|------------------------------------|-------|-------------|
| | 0-14 | 15-64 | 65 and Over |
| | % | % | % |
| 1901..... | 49.4 | 48.6 | 48.8 |
| 1961..... | 48.9 | 49.5 | 51.5 |
| 1991..... | 48.7 | 49.4 | 57.0 |

Source: Based on Table 3 (Appendix C).

The reasons for the proportional increase of females in the older group will be discussed later in the light of mortality patterns.

Because health conditions in Canada are frequently compared with those in other countries, particularly the United States and the United Kingdom, and data from these countries are often applied to the Canadian situation, it will be useful to compare some of the relevant demographic characteristics in these countries. The following tabulation compares density, annual rate of growth, and age distribution in Canada and the two countries referred to in the year 1961:¹

| | Canada | U.S.A. | England and Wales |
|-----------------------------------|--------|--------|-------------------|
| Density per km ² | 2 | 20 | 306 |
| Annual rate of growth..... | 2.2 | 1.7 | 0.7 |
| Age distribution:..... | % | % | % |
| 0-14 | 33.9 | 31.4 | 22.9 |
| 15-64 | 58.5 | 59.3 | 65.2 |
| 65 and over | 7.6 | 9.3 | 11.9 |
| Total..... | 100.0 | 100.0 | 100.0 |

Among these countries, Canada has by far the lowest density of population and, partly because of it, the highest rate of growth. It has the lowest proportion of its population in the age group 65 and over.

Where the People Are, Where They Go, and Where They Come From

While Canada, in the north-south direction, covers about half the distance from the equator to the pole, stretching over a distance of about 3,000 miles, it is only in a narrow strip of about one-tenth of that distance where most of Canada's population is found. This narrow band along the southern border measures only about 300 miles at its widest point. About nine-tenths of the north-south expanse are sparsely populated, much of it exposed to a harsh climate and not easily accessible. Due to the increased population, the density per square mile has also increased in all provinces and territories but not at the same rate, as shown in the following tabulation:²

| Province | Population Per Square Mile | | |
|-----------------------------|----------------------------|-------|---------------------|
| | 1951 | 1961 | Percentage Increase |
| Newfoundland | 2.53 | 3.20 | 26.5 |
| Prince Edward Island | 45.07 | 47.91 | 6.3 |
| Nova Scotia | 31.50 | 36.12 | 14.7 |
| New Brunswick | 18.53 | 21.48 | 15.9 |
| Quebec | 7.74 | 10.04 | 29.7 |
| Ontario | 13.36 | 18.12 | 35.6 |
| Manitoba | 3.67 | 4.35 | 18.5 |
| Saskatchewan..... | 3.78 | 4.20 | 11.1 |
| Alberta | 3.78 | 5.35 | 41.5 |
| British Columbia | 3.24 | 4.53 | 39.8 |
| All Provinces | 6.65 | 8.66 | 30.2 |
| Yukon | 0.04 | 0.07 | 75.0 |
| Northwest Territories | 0.01 | 0.02 | 100.0 |
| Canada..... | 3.93 | 5.12 | 30.3 |

¹ Based on United Nations, *op. cit.*, *passim*.
² Based on Dominion Bureau of Statistics, *Canada Year Book 1963-64*, p. 160.

The density of the population is an important factor in bringing patients and the required health care resources together, i.e., in fact making health services available to all Canadians. Because of the large area covered by most provinces and the territories, the situation within their boundaries varies considerably.

The density of areas within a province or territory is largely determined by the rural-urban distribution of the population which must also be taken into account in planning for health. The decade between the Censuses of 1951 and 1961¹ was one of continued urbanization: the percentage of people in rural areas has declined (from 37 to 29 per cent), and a larger percentage, from 63 to 71 per cent, have come to live in urban centres. Among the rural people it is the farm population which has declined most in numbers: from 20 per cent of the total population in 1951 to 12 per cent in 1961. Particularly rapid was the increase in the proportion of people in the larger urban communities with a population of 100,000 and over, whose percentage of the total population has risen from 37 to 46 per cent.

Equally important in tracing the health and other needs of the people is the shift within the cities, changing their basic character: "In the place of relatively compact centripetal communities that developed in the past, metropolitan centres with immense populations spilling over into sprawling suburbia have made their appearance".²

Where the people of Canada are, there also are their needs; where they go, there also move their needs, of which health needs are an important part. Migration, therefore, is "one of the most important factors that must enter into consideration for various types of planning".³ And Canadians are a very mobile people. In addition to the movement into and out of the country, and the general move to urban centres, there is within Canada a continuous shift of population from one province to another. Here, like in international migration, the motives vary: they may result from pressure (economic, political, social) at the point of origin, or the attractions at the point of destination. These attractions may again be of an economic, political, or social nature; they may lie in the climate, the presence of relatives or friends, or numerous other factors. Famine, depression, political upheaval have often been the mainspring for international migration. An exodus from depressed areas in Canada to other parts of the country also takes place from time to time and we hear, in fact, more and more about plans to systematically encourage and assist such movements. But people may also migrate because they are well off and can afford to travel and move for no other reason than to be in a climate that suits them better, or to live near the mountains, the sea, or the wide open spaces of the prairies.

While we have been vaguely aware of the existence of the many and complex motives for Canadians to move within their country, little has been known until

¹ Dominion Bureau of Statistics, 1961 Census of Canada, Bulletin 1, 1-7, Ottawa: Queen's Printer, 1963, inside cover.

² Kasahara, Y., "A Profile of Canada's Metropolitan Centres", *Queen's Quarterly*, autumn 1963, p. 303.

³ Kasahara, Y., "The Flow of Migration Among the Provinces in Canada, 1951-1961", C.P.S.A. Conference on Statistics, 1961, Papers, printed in the Netherlands, p. 20.

recently of the extent and the directions of such movements. For the first time estimates are now available of interprovincial migration between 1951 and 1961. Their author carefully points out the preliminary nature of the estimates which “may be subject to a fairly large margin of error”¹ but the figures presented give a useful idea of the order of size of the movement and they establish the fact that behind the rather negligible net migration across provincial boundaries lies a much brisker movement back and forth from province to province.² Altogether, this movement may involve as many as 500,000 people a year: “roughly two out of every hundred persons and about the same proportion of families with children under sixteen in this country apparently changed their residence across provincial boundaries in the course of one year”.³ The direction of these moves is shown in the following table:

TABLE 1
PERCENTAGE DISTRIBUTION OF ESTIMATED MIGRANT POPULATION BY PROVINCE OF DESTINATION FOR THE PROVINCES AND TERRITORIES OF ORIGIN, CANADA, FROM JUNE 1956 TO MAY 1961

| Province of Origin | Province of Destination | | | | | | | | | | | |
|---------------------|-------------------------|-------|--------|------|------|------|------|------|-------|-------|------|----------------|
| | Total | Nfld. | P.E.I. | N.S. | N.B. | Que. | Ont. | Man. | Sask. | Alta. | B.C. | Yukon & N.W.T. |
| Total..... | 100.0 | 1.4 | 1.2 | 7.0 | 5.3 | 13.3 | 28.2 | 7.9 | 7.4 | 14.0 | 12.5 | 1.7 |
| Nfld. | 100.0 | — | 1.5 | 24.9 | 8.1 | 14.1 | 40.3 | 3.1 | 1.3 | 3.5 | 2.9 | 0.2 |
| P.E.I. | 100.0 | 2.8 | — | 30.4 | 18.9 | 6.7 | 31.3 | 1.7 | 0.9 | 3.2 | 3.4 | 0.7 |
| N.S. | 100.0 | 4.5 | 4.4 | — | 18.8 | 13.5 | 45.1 | 3.0 | 0.9 | 2.9 | 6.4 | 0.6 |
| N.B. | 100.0 | 2.1 | 3.8 | 20.9 | — | 25.2 | 39.4 | 2.3 | 0.7 | 2.4 | 2.7 | 0.6 |
| Que. | 100.0 | 1.4 | 0.6 | 6.2 | 7.7 | — | 71.5 | 3.0 | 1.0 | 3.6 | 4.3 | 0.6 |
| Ont. | 100.0 | 2.1 | 1.5 | 12.0 | 7.6 | 37.1 | — | 13.0 | 5.1 | 10.3 | 10.1 | 1.3 |
| Man. | 100.0 | 0.5 | 0.4 | 2.6 | 1.6 | 5.9 | 36.3 | — | 18.8 | 16.9 | 15.8 | 1.2 |
| Sask. | 100.0 | 0.1 | 0.2 | 0.7 | 0.4 | 1.5 | 14.0 | 18.0 | — | 42.4 | 21.6 | 1.1 |
| Alta. | 100.0 | 0.3 | 0.3 | 1.6 | 1.0 | 3.7 | 19.0 | 9.4 | 21.2 | — | 38.7 | 4.7 |
| B.C. | 100.0 | 0.3 | 0.3 | 4.3 | 1.5 | 5.6 | 22.1 | 9.2 | 13.6 | 39.5 | — | 3.7 |
| Yukon & N.W.T. | 100.0 | 0.2 | 0.6 | 3.7 | 1.5 | 5.5 | 21.8 | 5.9 | 5.6 | 30.9 | 24.2 | — |

Source: Kasahara, Y., “The Flow of Migration Among the Provinces in Canada, 1951- 1961”, C.P.S.A. Conference on Statistics, 1961, *Papers*, printed in the Netherlands, p. 44.

These are very significant findings, not only because they indicate where the people - and their health needs - go but particularly also because they demonstrate clearly that health is indivisible and that provincial services must be dovetailed to deal with the health problems which know no geographic or provincial boundaries. The involvement in the interprovincial movement of sizeable numbers of families with their children as well as of unattached persons must be taken into consideration in planning for the provision of continuing care and follow-up where necessary.

The People and Their Changing Circumstances

The number of people making up the population of a community, province, or the whole country will in itself give some indication of the volume of health problems

¹ Ibid., p. 26.
² Ibid., pp. 26 and 27.
³ Ibid.

TABLE 2

PERCENTAGE DISTRIBUTION OF ESTIMATED MIGRANT POPULATION BY PROVINCE OF ORIGIN FOR THE PROVINCES AND TERRITORIES OF DESTINATION, CANADA, FROM JUNE 1956 TO MAY 1961

| Province of Origin | Province of Destination | | | | | | | | | | | |
|---------------------|-------------------------|-------|--------|-------|-------|-------|-------|-------|-------|-------|-------|----------------|
| | Total | Nfld. | P.E.I. | N.S. | N.B. | Que. | Ont. | Man. | Sask. | Alta. | B.C. | Yukon & N.W.T. |
| Total..... | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| Nfld. | 2.4 | — | 3.0 | 8.5 | 3.6 | 2.5 | 3.4 | 0.9 | 0.4 | 0.6 | 0.6 | 0.3 |
| P.E.I. | 1.4 | 2.8 | — | 5.9 | 4.9 | 0.7 | 1.5 | 0.3 | 0.2 | 0.3 | 0.4 | 0.6 |
| N.S. | 8.3 | 27.0 | 29.6 | — | 29.5 | 8.4 | 13.3 | 3.2 | 1.0 | 1.7 | 4.2 | 2.8 |
| N.B. | 6.9 | 10.4 | 21.4 | 20.5 | — | 13.1 | 9.7 | 2.0 | 0.6 | 1.2 | 1.5 | 2.5 |
| Que. | 14.6 | 15.4 | 6.9 | 12.9 | 21.3 | — | 37.1 | 5.4 | 2.1 | 3.7 | 5.1 | 5.5 |
| Ont. | 22.0 | 33.6 | 27.3 | 37.5 | 31.4 | 61.4 | — | 36.1 | 15.1 | 16.2 | 17.6 | 17.3 |
| Man. | 9.3 | 3.6 | 3.3 | 3.4 | 2.9 | 4.1 | 11.9 | — | 23.6 | 11.2 | 11.7 | 6.4 |
| Sask. | 10.5 | 1.0 | 1.5 | 1.1 | 0.7 | 1.2 | 5.2 | 23.7 | — | 31.7 | 18.0 | 6.6 |
| Alta. | 12.5 | 3.2 | 3.5 | 2.9 | 2.3 | 3.5 | 8.4 | 14.8 | 36.0 | — | 38.6 | 34.4 |
| B.C. | 10.9 | 2.8 | 2.9 | 6.6 | 3.1 | 4.6 | 8.5 | 12.6 | 20.0 | 30.7 | — | 23.6 |
| Yukon & N.W.T. | 1.2 | 0.2 | 0.6 | 0.6 | 0.3 | 0.5 | 0.9 | 0.9 | 0.9 | 2.7 | 2.3 | — |

Source: Kasahara, Y., "The Flow of Migration Among the Provinces in Canada, 1951-1961", C.P.S.A. Conference on Statistics, 1961, *Papers*, printed in the Netherlands, p. 48.

to be encountered. Knowledge of their age and sex distribution will further- more indicate in a general way the distribution of health problems peculiar to broad groups.

The modern approach in medicine, however, towards considering the whole person, the practice of social medicine, the study of human ecology, and increasing emphasis on care in the patient's normal environment and, where applicable, re- storing him to his fullest possible function in that environment, call for considera- tion of the individual's social circumstances. It will be useful, therefore, in considering the health status of the population as a whole also to give some at- tention to the changing social environment in which Canadians live. Awareness of these trends will give the social physician, the medical officer, the public health nurse, the medical social worker, and the health service's planner and administrator a better knowledge of what to expect in their practice and, to some extent, what they may encounter in their practice.

One of the most important factors molding a person's health and social situa- tion is the family environment: 88 per cent of Canada's population lived as mem- bers of families in 1961.¹

The Family

The extent of family formation is indicated by the marriage rate, i.e., the number of marriages per 1,000 population. This rate has been declining since 1951 as follows:

¹ Some 16 million persons, 7.8 million of them children, out of a population of some 18 million (Dominion Bureau of Statistics, 1961 Census of Canada, Ottawa: Queen's Printer, 1962, *passim*).

Marriage Rates, Canada 1951 -1963

| | | | | | | | | | | | | | |
|-------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Year: | 1951 | 1952 | 1953 | 1954 | 1955 | 1956 | 1957 | 1958 | 1959 | 1960 | 1961 | 1962 | 1963 |
| Rate: | 9.2 | 8.9 | 8.8 | 8.4 | 8.2 | 8.3 | 8.0 | 7.7 | 7.6 | 7.3 | 7.0 | 7.0 | 6.9 |

Source: Dominion Bureau of Statistics, Vital Statistics 1962, and Vital Statistics 1963 (Preliminary Annual Report), Ottawa: Queen’s Printer, 1964, pp. 229 and 4 respectively.

The divorce rate has shown no definite trend but fluctuated around a level of only about one-twentieth of the marriage rate.

People marry at a younger age than they used to. The median age of brides has gone down from 22.0 in 1951 to 21.1 in 1962, that of grooms from 24.8 in 1951 to 23.9 in 1962.¹

The average size of the family has increased from 3.7 in 1951 to 3.9 in 1961,² as a result of the movement of the birth rate and fertility patterns at the time when the existing families were formed.

In recent years, however, both birth rate and fertility rate have been declining, the birth rate from 27.2 live births per 1,000 population in 1951 to 25.3 in 1962, and the fertility rate (i.e., births per 1,000 women aged 15 -49) from 109.2, after reaching 118 in 1957, to 108.5 in 1962.³ Fertility rates are related to the duration of marriage and are affected by marriage occurring at a younger age, but they are also subject to social and economic determinants. The recent trends have been summarized as follows:

“A more or less consistent decline in the fertility rates among women over 30 years of age in the last ten years implies that the majority of present-day women tend to complete their childbearing period within ten or fifteen years after their marriage. This trend is also demonstrated by the decline in the proportion of large families with five or more children. Among the younger women, on the other hand, the fertility rates showed an impressive rise over the ten years prior to 1958. This reflects the post-war trend towards younger marriages and earlier childbearing than in the preceding decades. Since 1958, however, the fertility rates among these younger women have also begun to show a downward trend.”⁴

Because of their complex causative factors, fertility rates are difficult to project with any degree of accuracy but they deserve close observation by the health worker not only as a determinant for population growth but also because of the impact of maternity, newborn, and childhood conditions on the demand for health care.

Education

The factor with probably the greatest effect on a man’s or woman’s role in the community and society at large - besides their personal inclination, talent, and

¹ Dominion Bureau of Statistics, Vital Statistics 1962, Ottawa: Queen’s Printer, 1964, p. 232.
² Dominion Bureau of Statistics, 1961 Census of Canada, Ottawa: Queen’s Printer.
³ Dominion Bureau of Statistics, Vital Statistics 1962, Ottawa: Queen’s Printer, 1964, pp. 97 and 101.
⁴ Kasahara, Y., “Population Projections to 1970”, in Population and Labour Force Projections to 1970, Staff Study No. 1, Economic Council of Canada, Ottawa: Queen’s Printer, 1965, p.3.

ambition - is their education, and it is here that some of the greatest and most rapid changes have taken place in recent years resulting in more Canadians having more and more education. The education explosion will continue for some time to come for two reasons: first, higher levels of education are required for the entry into the labour force, and second, many of those already participating in the labour force find a growing need for continuing education to keep abreast with scientific and technological development.

“Increasing proportions of young people are remaining in school”, statistics show, “beyond the legal school leaving age to obtain high school diplomas and to proceed to university or other post-secondary educational institutions.”¹ Whereas in the school year 1951-52 only 42 per cent of the total population aged 14-18 were enrolled in secondary schools, the percentage had risen to 69 by 1962-63.²

This trend has its effect on higher education. Between the academic years 1950-51 and 1962-63, the number graduating from Canadian universities and colleges has increased from 16,000 to 25,000. It had reached 28,000 by 1963-64.³ Thus, the number of graduates has increased by 75 per cent between 1951 and 1964, outstripping by far the 20 per cent increase in the population aged 20-24 during the same period.

The rapidly changing pattern in the educational attainment of the people and in the availability of educational facilities has very direct implications on the recruitment and education of the health professions. These health manpower problems have been studied and discussed by the Royal Commission on Health Services in the first volume of its Report. But a more educated public must also be expected to develop different attitudes towards health and illness, towards the use of health services, and towards the health professions. Thus, for instance, the patient's respect for his physician will less often be based on the awe of the uneducated towards one of the very few professionals in the community of old; it will be replaced by the probably no lesser, though different respect prevailing among professionally or otherwise well educated people.

Income

Income and educational attainment generally show a high degree of relationship.

The changing incomes of Canadians were discussed by the Royal Commission on Health Services.⁴ The Commission observed that “many individuals and families have moved up in the income scale but there remains a sizeable proportion of our population whose level of income keeps them at or below what is now considered a minimum standard of living in Canada”.⁵ The Commission examined the question

¹ Dominion Bureau of Statistics, Canada 1964, Ottawa: Queen's Printer, 1964, p.58.

² Ibid.

³ Dominion Bureau of Statistics, Canada Year Book 1954, Ottawa: Queen's Printer, 1954, p. 328, and Dominion Bureau of Statistics, Education in Canada 1963-64, Ottawa: Queen's Printer, 1964, p. 43 (figures relate only to bachelor and first professional degrees).

⁴ Royal Commission on Health Services, Volume I, Ottawa: Queen's Printer, 1964, pp. 122 - 137.

⁵ Ibid., p. 137.

of income distribution primarily from the point of view of the people's ability to pay for health services, directly or through premiums. The relationship between low income and health conditions will be discussed more fully later but suffice here to say that conditions of poverty bear some relationship to health problems and that, therefore, it is important for the health worker to be aware of the continued existence of poverty in Canada's population.

Being mainly concerned here, however, with general changes in terms of averages rather than individual cases, a comparison of the per capita share in the Gross National Product (or Expenditure) will reflect the changes in the economic status of Canadians. Thus, the per person Gross National Product has risen in the five-year period from 1959 to 1963 by \$279 (from \$1,997 to \$2,276). This is the figure expressed in current dollars. After eliminating the inflationary factor which accounts for about half of the increase, we still have an increase of \$147 (from \$1,910 to \$2,057) in terms of constant (1957) dollars.¹ The increase is indicative of the improving levels of living in general, of which we will find further evidence in this review of changing conditions of the Canadian people.

Work

Work in the sense of "working for a living" is reflected in the extent and type of participation in the labour force. The pattern of this participation varies distinctly between men and women. Among men it has decreased in recent years and is expected to continue to decrease during the period till 1970. There has been little or no change in the middle-age group between 25 and 54 years. Among the younger men, however, participation has declined due probably largely to longer stay in school. The decline among the older men may be due to the increasing difficulty in finding jobs and perhaps to some extent also the improved financial provisions for retirement and old age. Of those in the labour force, there is a decreasing proportion in agriculture.

Among women the total participation rate has been increasing and is expected to continue to increase at least for the several years until 1970. The only decrease in recent years was in the teen ages due probably to higher school attendance. The largest increase in the participation rates took place among women aged 45 to 54, but there also have been substantially greater proportions of women working in the age groups 35 to 44 and 55 to 64. This trend is accompanied by a gradual decline in the percentage of women keeping house. According to projections, working women will account for an increasing proportion in all age groups but particularly between ages 35 and 64.

The distribution of those employed in the various industrial groups has shown a decreasing proportion of those employed in agriculture and an equally consistent increase in the service industries.²

¹ Dominion Bureau of Statistics, *National Accounts - Income and Expenditure 1963*, Ottawa: Queen's Printer, 1964, p. 20.

² All statements regarding past and projected trends based on Denton, F.T., and Ostry, S., "Labour Force Projections to 1970", in *Population and Labour Force Projections to 1970*, Staff Study No. 1, Economic Council of Canada, Ottawa: Queen's Printer, 1965, p. 37, and Dominion Bureau of Statistics, *Canada Year Book 1963-64*, Ottawa: Queen's Printer, 1964, pp. 714 and 715.

There has been over the years a definite shift within the occupational pattern of the labour force. Table 3 shows the trend during the decade 1951 to 1961 to be the continuation of long-term changes going back to 1911:

TABLE 3
PERCENTAGE DISTRIBUTION OF LABOUR FORCE, BY OCCUPATIONAL
GROUP AND SEX, CANADA, 1911,
1951 AND 1961

| | 1911 | | 1951 | | 1961 | |
|-----------------------------------|--------|--------|--------|--------|--------|--------|
| | Male | Female | Male | Female | Male | Female |
| All occupations..... | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| Proprietary and managerial..... | 5.17 | 1.60 | 8.70 | 3.01 | 9.57 | 2.93 |
| Professional | 2.41 | 12.74 | 5.30 | 14.43 | 7.68 | 15.52 |
| Clerical | 2.96 | 9.39 | 5.93 | 27.46 | 6.72 | 28.55 |
| Agricultural..... | 38.97 | 4.44 | 19.30 | 2.77 | 12.21 | 4.30 |
| Fishing, hunting, trapping | 1.46 | 0.07 | 1.28 | 0.02 | 0.78 | 0.02 |
| Logging | 1.77 | — | 2.46 | — | 1.69 | 0.01 |
| Mining, quarrying..... | 2.60 | — | 1.59 | — | 1.38 | — |
| Manufacturing and mechanical..... | 11.70 | 26.25 | 17.91 | 14.63 | 18.37 | 9.89 |
| Construction | 5.48 | 0.01 | 7.06 | 0.08 | 7.14 | 0.05 |
| Transportation..... | 6.29 | 1.48 | 9.20 | 2.90 | 9.75 | 2.23 |
| Commercial | 4.06 | 6.74 | 4.72 | 10.40 | 5.59 | 10.04 |
| Financial..... | 0.31 | 0.02 | 0.75 | 0.13 | 1.05 | 0.20 |
| Service..... | 3.08 | 37.18 | 6.55 | 21.24 | 8.54 | 22.60 |
| Labourers..... | 13.74 | 0.06 | 8.01 | 1.79 | 6.88 | 1.19 |
| Not stated | — | — | 1.25 | 1.13 | 2.66 | 2.46 |

Source: Dominion Bureau of Statistics, 1961 Census of Canada, Bulletin 3.1-1, Ottawa: Queen's Printer, 1964, pp. 3-1 and 3-2.

The changes are in some cases working in opposite directions for men and women. It will be noted from Table 3 that the following occupational groups have been assuming *increasing* proportions:

Among Men

Proprietary and managerial
Professional
Clerical
Manufacturing and mechanical
Construction
Transportation
Commercial
Financial
Service

Among Women

Professional
Clerical
Agricultural
Financial
Service

Decreasing proportions prevail in the following groups:

| Among Men | Among Women |
|----------------------------|------------------------------|
| Agricultural | Proprietary and managerial |
| Fishing, hunting, trapping | Manufacturing and mechanical |
| Logging | Construction |
| Mining, quarrying | Transportation |
| Labourers | Commercial |
| | Labourers |

Generally speaking, it is a move away from agriculture and other primary production as well as from unskilled labour into the kind of occupations that go hand in hand with the trends we have observed towards urbanization, more education, and higher incomes.

The health implications of these changing patterns of work participation will be found, apart from matters of occupational health, mainly among the retired and those approaching retirement, the working women, and particularly the working mothers and their families. It is also during the working ages that we have to look for the causation and onset of chronic conditions which become more prominent in later years. The type of work and the degree of involvement in physical and mental activity do have a bearing on health as growing proportions of people shift into new working environments.

The Newcomers to Canada

Immigration, as we have seen, is an important factor in shaping Canada's population. As attitudes towards health and disease, as well as towards health services and to some extent illness patterns themselves, may vary among people with different cultural background, there will be occasions when the health worker has to take such variations into account. Language problems may also arise where the newcomers are from countries other than the Commonwealth.

During three successive Censuses the proportion of people born outside Canada was as follows: ¹

| | 1941 | 1951 | 1961 |
|--------------------------------|------|------|------|
| | % | % | % |
| Born outside Canada..... | 17.5 | 14.7 | 15.6 |
| In Commonwealth countries..... | 8.7 | 6.7 | 5.6 |
| Other..... | 8.8 | 8.0 | 10.0 |

The last decade shows a shift among those born outside Canada from the Commonwealth to other countries. Among the immigrants there have been consistently more females than males since 1957, ² probably due to the trend towards the service sector in the labour force.

¹ Based on Dominion Bureau of Statistics, *Canada Year Book 1963-64*, Ottawa: Queen's Printer, 1964, p. 175.

² *Ibid.*, p. 205.

THE WORLD AROUND US

The people and the world around them are closely interrelated and interacting. In the past, man’s reaction to his environment has been largely a passive one, taking the form of protection against the often hostile forces of nature, and the conditions created by the concentration of large numbers of people in towns and cities. Increasingly, however, man has in modern times actively influenced the environment.

The extent to which we succeed in protecting ourselves against the hostile elements around us, the extent to which we are able to improve our environment, and the extent to which we adversely affect this environment has direct effects upon our well-being and particularly our health in the narrower sense. The component parts of this environment range from the man-made house and its contents to the natural conditions of climate, geography, and topography. They include the functioning of the society in which we live, whose accomplishments, aspirations, and demands on the individual will also affect the health of its members either favourably or adversely.

Housing

The function of the house has come a long way from its original purpose of providing protection against the elements. While for all too many Canadians their housing does not adequately fulfil its role as shelter,¹ there has been a trend for housing to change gradually from being a shelter to not only a place but “a machine” for living, the latter term implying not necessarily the coldness of a machine but the effectiveness of modern housing.

This trend is illustrated by changes that have been taking place in regard to some characteristics of Canadian housing. Following is a comparison of certain characteristics on which data are collected in the centennial Censuses. The figures show the percentage of occupied dwellings in each category in consecutive Census years:

| ITEM | Per Cent of All Occupied Dwellings | |
|--|------------------------------------|------|
| | 1951 | 1961 |
| Owner-occupied..... | 65.6 | 66.0 |
| Dwellings in need of major repair..... | 13.4 | 5.6 |
| Crowded dwellings..... | 18.8 | 16.5 |
| Dwellings heated by: | | |
| Coal or wood..... | 70.0 | 23.3 |
| Oil..... | 22.7 | 56.3 |
| Gas..... | 4.8 | 18.8 |

¹ Individual cases are evident even within Canada’s prosperous areas but particularly the depressed or underdeveloped parts of the country. Regarding the former see the various poverty studies; regarding the latter see also the Report of the Royal Commission on Health Services, Vol. I, p. 224, and Vol. II, pp. 277 and 278. A striking illustration of the effects of housing on health is presented in Department of National Health and Welfare and Department of Northern Affairs and National Resources, Eskimo Mortality and Housing, Ottawa, 1960. Although related to a specific situation, many of the conclusions are generally applicable.

| ITEM | Per Cent of All Occupied Dwellings | |
|----------------------------------|------------------------------------|------|
| | 1951 | 1961 |
| Dwellings with: | | |
| Hot and cold running water | 56.9 | 80.1 |
| Bath or shower | 60.8 | 80.3 |
| Flush toilet | 68.3 | 85.2 |
| Mechanical refrigerator | 46.8 | 91.0 |
| Steam or hot water furnace | 15.5 | 18.2 |
| Hot air furnace | 30.9 | 49.2 |
| Passenger automobile | 42.3 | 68.4 |

Source: Based on Dominion Bureau of Statistics, Canada Year Book 1963-64,
Ottawa: Queen's Printer, 1964, p. 701.

Some of these items like crowding, state of repair, running water, bath, flush toilet, and refrigeration have a direct bearing on the health status of the occupants of the dwelling, others are more remotely related to it or indicate the changes in the general level of living.

The picture then is one of continuing improvement which can be assumed to have further progressed since the 1961 Census. It is the dwelling, its condition, and content which determine the environment in which Canadians spend most of their lives. It is the predominant environment for the family life during the formative years. It also remains an important factor in the life of those absorbed into the labour force by providing the framework for rest, recreation, family life, and increasingly also continued education.

The close association between housing standards and health, and inturn the social environment determining the condition of the habitation, has often been observed and studied. What Chadwick found over a hundred years ago among the labouring population of Great Britain still holds wherever poor housing prevails:

“Thus tenements of inferior construction had manifestly an injurious operation on the moral as well as on the sanitary condition, independently of any overcrowding. For example, it appears to be a matter of common observation in the instance of migrant families of workpeople who are obliged to occupy inferior tenements, that their habits soon become ‘of a piece’ with the dwelling ... the dampness of which affects the health, and causes personal uncleanness, induced by the difficulty of keeping a clean house ... As in most cases, the internal economy of the houses were primarily affected by the defective internal and surrounding drainage that produced the damp and wet, and thence the dirt against which the inmates had ceased to contend ... The close pent up air in these abodes has, undoubtedly, a depressing effect on the nervous energies, and this again, with the uneducated, and indeed with many of the educated workpeople, has an effect on the moral habits by acting as a strong and often irresistible provocative to the use of fermented liquors and ardent spirits In such places as those in his district, in such atmospheres, a store of provisions would not keep: everything decayed rapidly, and the workpeople consequently lived ‘from hand to mouth’.”¹

¹ Report to Her Majesty's Principal Secretary of State for the Home Department from the Poor Law Commissioners, on an Inquiry into the Sanitary Condition of the Labouring Population of Great Britain, London, 1842, pp. 127-130.

Many studies have since shown the correlation between poor housing and the prevalence of disease as well as diminished social well-being. This has been demonstrated for certain diseases such as tuberculosis, venereal disease, or infant mortality, and the relationship has also been shown in more general studies such as a longitudinal study undertaken by the Johns Hopkins University.¹

It must be remembered though, as already pointed out, that housing itself is generally the result of the social and economic situation of the inhabitants. Under conditions of poverty, therefore, poor housing will often be associated with poor nutrition, poor knowledge and hygiene practices, poor clothing and other factors adversely affecting health.

Social Participation: The Smaller World We Live In

Beyond their homes, people establish many and varied contacts with the community around them. These may be informal neighbourly contacts and social activities, or formalized such as going to school, having a job, and playing an active part in community organizations.

Contact with the world around us is increasingly facilitated by improved communication and transportation. The telephone is an important link between patients and health care resources. We find that the number of telephones, both business and residential, has been increasing rapidly during recent years, having almost doubled in the decade from 1951 to 1961. In the latter year there were 33 telephones per 100 population in Canada, compared to 22 in 1951.²

The growing extent to which travel brings people in contact with each other and with different environments can only roughly be deduced from the miles of travel on Canadian airlines and railways. The decline in railway travel has been more than compensated by air travel and, in addition, there has been the increased use of the motor car to overcome distances.

The following estimates by the Dominion Bureau of Statistics³ not only show how much travel there is in Canada but they also demonstrate clearly shifts in the mode of travel, shifts which are not only interesting because of their social and economic implications, but also are important to the health services that have to follow the travelling public.

| Year | Total Miles Travelled | Miles per Person per Year |
|------|-----------------------|------------------------------|
| 1951 | 27,645,000,000 | 1,973 |
| 1961 | 49,975,000,000 | 2,740 |
| 1963 | 54,776,000,000 | 2,899 |

¹ Wilner, D.M., et al., *The Housing Environment and Family Life*, Baltimore: Johns Hopkins University Press, 1962.

² Based on Dominion Bureau of Statistics, *Telephone Statistics*, Ottawa: Queen's Printer, annual reports.

³ They refer to what the Bureau defines as "intercity passenger-miles" and cannot, of course, distinguish between Canadians and tourists who, after all, also bring their health problems with them (based on Dominion Bureau of Statistics, *Daily Bulletin*, January 11, 1965, Ottawa: Queen's Printer, 1965, p. 4).

The 1963 figures have been added to show the rate with which travel has increased during the recent years. From 1951 to 1963 the travelled mileage has almost doubled. The two-thousand-mile-per-capita average in 1951 will be astonishing to many; it had increased by almost 50 per cent by 1963. There have been marked shifts in the mode of travel, particularly from rail to car and air travel.¹

| Year | Percentage Distribution of Passenger Miles | | | | |
|------|--|------|-----|------|-------|
| | Car | Bus | Air | Rail | Total |
| 1951 | 74.2 | 12.5 | 2.0 | 11.3 | 100.0 |
| 1961 | 85.7 | 5.3 | 5.1 | 3.9 | 100.0 |
| 1963 | 86.0 | 5.3 | 5.0 | 3.7 | 100.0 |

The increased travel combined with the greater speed with which distances are covered has implications for health other than the ease of contact with greater numbers of other people. It means also a smaller world in respect to health hazards present in other regions and parts of the world. On the other hand, for people in rural areas it means that a physician can be reached more readily by telephone and that a trip to the nearest doctor or hospital which may once have taken a day's journey can now be made in less than an hour. It means that even in remote areas a patient and the services he needs can be brought together fairly quickly by aircraft where previously communication or contact may have been altogether impossible.

Together with the earlier described rate of migration, the increased mobility of Canadians raises new problems for the health services in the field of communicable disease control as well for the continued care and follow-up for certain chronic conditions.

Mass Media

All the characteristics and activities of the population mentioned in this chapter will affect in some degree the physical and mental health of the people. In particular, education both formal and informal will have its effect on the knowledge of and the attitudes towards health matters. Health education must be thought of in this context, and this in its broadest sense ranging from formal lectures and publications to the advice imparted by the physician, the public health nurse, or other health workers in the course of their care.

Both in regard to molding people's attitudes concerning matters of health and in regard to imparting to them authoritative information as part of health education programmes, the use and impact of the mass media is important.

The radio has ceased to be an attribute of the home only. In its small and portable editions it often accompanies people wherever they go. Exposure to the movies is declining: admissions in 1961 were about half of what they were ten

¹ Ibid.

years earlier, a decline which is still more pronounced when related to the growing population (18 admissions per person in 1951, and 7 in 1961).¹ Television, on the other hand, has become an increasingly important medium, and one that reaches all age groups. While the first two television stations in Canada began regular service only in 1952, by 1961 some 78 per cent of all dwellings had at least one television set.²

The press is reaching more and more people. The circulation of daily newspapers in Canada has gone up from 3.5 million in 1951 to 4.1 million in 1961,³ an increase of over half a million. Prorated to the population increase, however, it means that in 1951 there was a daily newspaper for every 4 persons, but only one for every 4.5 persons in 1961. The increase in the same period of the family size leads one to assume that one copy of a newspaper was read by more people in 1961. During this decade the number of weekly papers and magazines has also increased but their circulation is not known.

Town and Country Living

If this study of the health of the Canadian people is limited to generalizations applying to the country as a whole, it must be remembered that there are significant local or regional differences. Exceptions should be made, however, in the case of Canada's northern territories which cover four-tenths of the country's area and where many of the statements relating largely to the area below the 60th parallel do not apply. There are also considerable differences even within the provincially organized areas and among communities of various sizes. These differences and their impact on health services require a far more detailed study. Certain differences in the way people live are the result of differences between the rural and urban environment and it may be well to draw the health worker's attention to this fact, if only in broad and general terms. While the rural proportion of the population has been gradually decreasing, it still remains substantial.

The differences between the rural and urban setting are manifold, rooted in the way of life as well as the physical conditions. The occupational pattern is different; so is the amount and type of income; there is the problem of distances and scarce community services. On the other hand, there is, for many a deep attachment to rural living which compensates for some of the amenities that may be lacking. There are many problems arising in the provision of health services to rural areas.

As to living conditions closely related to health, a few examples will illustrate the extent to which rural families and individuals have not fully shared in the advances of their urban contemporaries. Table 4 will demonstrate this point:

¹ Dominion Bureau of Statistics, *Canada Year Book 1963-64*, and *Canada Year Book 1954*, Ottawa: Queen's Printer, 1964 and 1954 respectively.

² Dominion Bureau of Statistics, *1961 Census of Canada, Bulletin 2*, 2-5, Ottawa: Queen's Printer, 1963, p. 55-1.

³ Dominion Bureau of Statistics, *Canada Year Book 1954* and *Canada Year Book 1963-64*, Ottawa: Queen's Printer, 1954 and 1964, pp. 906 and 843 respectively.

TABLE 4
SOME CHARACTERISTICS OF DWELLINGS –
COMPARISON BETWEEN FARM, RURAL, AND URBAN DWELLINGS,
CANADA 1961

| Characteristics of Dwelling | Percentage of Dwellings with the Specified Characteristic: | | |
|----------------------------------|--|------------------------------|-------|
| | Farm | Rural (farm and non-farm) | Urban |
| Condition: | % | % | % |
| Good..... | 60.1 | 63.0 | 78.3 |
| In need of minor repair | 30.5 | 27.6 | 17.5 |
| In need of major repair..... | 9.4 | 9.4 | 4.1 |
| Constructed before 1920..... | 52.1 | 38.0 | 27.7 |
| Occupancy for more than 10 years | 65.3 | 46.6 | 25.4 |
| Without running water..... | 39.4 | 34.5 | 1.7 |
| With running water | 60.6 | 65.5 | 98.3 |
| Bath or shower | 41.3 | 47.4 | 93.2 |
| Inside flush toilet..... | 46.8 | 53.8 | 97.4 |
| Mechanical refrigerator | 80.0 | 78.7 | 95.8 |
| Home freezer..... | 40.7 | 25.6 | 10.7 |

Source: Based on Dominion Bureau of Statistics, 1961 Census of Canada, Ottawa: Queen’s Printer, 1963, Bulletin 2. 2-1, pp. 15-1, 10-1; Bulletin 2. 2-3, pp. 35-1, 40-1; Bulletin 2. 2-5, p. 55-1.

The fact that farm houses are generally older than city homes could in itself indicate merely that they are better built. But the figures in the top of the table show clearly that more farm and rural houses are in need of repair. When it comes to sanitary conditions, we find that practically all city houses have running water, whereas almost 40 per cent of the farm homes have not. And less than half of the farm homes have a flush toilet or a bath.

Mechanical refrigeration, however, is widely used on farms, more so than in the rural non-farm area. And substantially more farm than city homes have home freezers. The availability of refrigeration follows the extension of electric power into rural areas. In regard to home freezers it must be remembered that reliable storage for his own produce means much more to the farmer than a freezer means in the city where a large freezing compartment in the ordinary refrigerator will often serve the need.

THE CHANGING WAY OF LIFE

Leisure Time

We have already examined certain changes resulting from the transformation in the social and economic environment of Canadians. How much this has also affected their way of life can be demonstrated here only briefly by mentioning a few instances where statistical assessment is possible and a fairly direct relationship to the health status exists.

The importance of people’s personal activities and pursuits is emphasized by the trend towards more spare time. The gradual reduction in working hours means increasing time for recreation or, in some cases, for additional work. The availability of spare time and the way in which it is used has implications on the physical and mental health of those involved. Data on working hours are available only for those employed in industry but these may be taken as indicative of the general trend for the majority of the people in the labour force. Table 5 indicates the trend.

TABLE 5
WORK HOURS AND VACATIONS IN MANUFACTURING INDUSTRIES,
CANADA, 1951 AND 1961
(Percentage of employees covered)

| | Plant Employees | | Office Employees | |
|--|-----------------|------|------------------|------|
| | 1951 | 1961 | 1951 | 1961 |
| | % | % | % | % |
| Standard weekly hours, 40 and under | 35.8 | 72 | 87.2 | 96 |
| Statutory holidays, 8 or more | 44.5 | 72 | 76.0 | 87 |
| Vacations with pay, 3 weeks | 47.8 | 72 | 54.6 | 83 |

Source: Based on Dominion Bureau of Statistics, Canada Year Book 1956 and 1963-64, Ottawa: Queen’s Printer, 1956 and 1964, pp. 754-766 and 728-729 respectively.

One estimate regarding the trend in the distribution of work and leisure time over a century runs as follows:¹

| Year | Weekly Hours of | |
|------------|-----------------|---------|
| | Work | Leisure |
| 1870 | 68 | 16 |
| 1900 | 60 | 24 |
| 1930 | 48 | 36 |
| 1940 | 47 | 37 |
| 1950 | 45 | 39 |
| 1960 | 41 | 43 |
| 1970 | 35 | 49 |

The data are indicative of the fact that an increasing number of Canadians have more leisure time at their disposal. This places increased emphasis on the need for leisure time pursuits conducive to the maintenance of fitness and health. The need becomes greater as mechanization and automation reduce physical activity at work and at home, but at the same time probably often add to mental stress. This latter point was investigated by a team of experts under the auspices of the World Health Organization. The resulting report² deals with the psychological

¹ Brooks, L., “The Forces Shaping Demand for Recreation Space in Canada”, Resources for Tomorrow Conference, Background Papers, Vol. II, Ottawa: Queen’s Printer, 1961, p. 941 (figures based on Taylor, G.Q., An Evaluation of Non-Urban Recreation and Tourism, unpublished paper).

² World Health Organization, Mental Health Problems of Automation, Technical Report Series No. 183, Geneva: World Health Organization, 1959.

repercussions of automation and its direct effects on mental health as well as the indirect consequences as a result of the accompanying social changes. It stresses the importance of counteracting these effects by appropriate leisure time pursuits.

It is largely the task of education to implant the concepts of the kind of leisure time pursuits which would promote rather than destroy physical and mental health. Sir Richard Livingstone stressed this aspect in his book *On Education*, observing that "fifty years ago leisure was no concern of any but the well-to-do, who mostly wasted it. Today its use is becoming a problem". This was said twenty years ago. Today the problem is greater still. Leisure, perhaps the greatest force in helping people to become human beings rather than mere workers or human capital, is in danger not only of being wasted but of doing more harm than good in the long run. To provide the opportunities for healthful pursuits and to encourage their use has become the objective of many voluntary organizations as well as government agencies at all levels.

While there is fear of a trend towards more passive recreation, spectator sports, and asocial behaviour, there are here and there also encouraging signs of a growing interest in more salutary activities. For instance, business men, professionals, and other people in the labour force categories that are increasing proportionally, spend their lunch hour doing exercises at the "Y". The records of the Central YMCA in Ottawa show that in 1957 there were 28 sessions with 410 attendances in their gym and "keep fit" classes, whereas by 1964, they had 72 sessions with 1,755 attendances. This trend is probably paralleled elsewhere: YMCA figures for Canada show that attendances at physical classes and teams had increased from 16 million in 1957 to 27 million in 1964.¹ These are still very small numbers. Of the thousands of civil servants, business people, and others with sedentary jobs in the heart of Ottawa only about 20 or 25 attend the classes. There are, of course, other ways and means of exercising,² and it is encouraging that the number of known exercisers, if small, is increasing. It is a sign of the growing awareness of fitness. Mr. Keir, the Physical Director of the Central Ottawa "Y" finds that people used to come there to learn special skills and sports; now, he says, they come more and more to exercise just for fitness' sake.³ The national Fitness and Amateur Sport Program "is designed to help every Canadian who seeks a fuller life through the enjoyment of active leisure pursuits".⁴ This programme came into effect in December 1961, and it is perhaps too early to assess its impact. But its activities are expanding: of the provided annual allocation of \$5 million, \$2 million was made available under the Act for the year 1963-64, and \$3 million for 1964-65.⁵ The programme not only encourages and supports these activities and increases the supply of personnel, but it also supports research into the concepts of physical and mental fitness, and its measurement.

¹ YMCA Yearbook and Official Roster, 1957: pp. 156, 157; 1964: pp. 132, 133.

² The sale of the "5 BX" booklets illustrates this.

³ Personal communication.

⁴ From a release by the Department of National Health and Welfare.

⁵ Department of National Health and Welfare, Fitness and Amateur Sport Program, Annual Report for the fiscal year 1963-64, p. 1.

This will also lead to a better understanding of positive health as discussed in the previous chapter.

Another way of using the expanding leisure time to compensate for the industrialized and urbanized way of life is the use of the outdoors. It is hard to measure the move to rural residences within commuting distance, or to cottages in the summer and to the ski slopes in the winter but the statistics regarding the use made of provincial and national parks indicate a growing interest in these forms of a "back to nature" movement.¹ The Resources for Tomorrow Conference² dealt with the need for recreational facilities arising out of the availability of more leisure time and more money to spend. The chairman³ of one of the discussion groups pointed out the reason for recreational facilities by stating that it is necessary to "establish in the minds of the citizens of Canada the fact that physical, mental and spiritual recreations comprise one-third of the essentials which sum up human health and happiness". It was also emphasized that the facilities for recreation must be such as to compensate for the stress of modern working conditions, particularly the lack of satisfaction on assembly line jobs.⁴

Canada's national, provincial, and city parks have a major role to play in providing opportunities for recreation away from the work-a-day setting. "Parks yield the recreation, refreshment, aesthetic enjoyment and knowledge essential to national health and well being", according to a recent policy statement by the Parks Branch of the Department of Northern Affairs and National Resources.⁵ The late awareness of the value of nature is being ascribed to the fact that Canada, after all, is a young nation and it was not so many years ago that a significant percentage of the population lived in or very close to wilderness, or at least in rural surroundings.⁶ There seems to be a danger, however, of defeating the basic purpose of the parks by yielding to demands that these last preserves of a natural environment be gradually assimilated to the accustomed city life instead of offering a refuge from it. Surely what is needed and expected of the parks is not just another place wherein to continue the city life but a place where we can get away from it for a while:

"At the gates of the forest, the surprised man of the world is forced to leave his city estimates of great and small, wise and foolish. The knapsack

¹ Jean Jacques Rousseau told his contemporaries: "que la nature a fait l'homme heureux et bon mais que la société le déprave et le rend misérable" (Discours sur l'origine de l'inégalité).

² Held in Montreal in 1961.

³ Turner, D.B., "Providing an Adequate Resource Base for Public Recreation", Proceedings, Resources for Tomorrow Conference, Vol. III, Ottawa: Queen's Printer, 1962, pp. 169-179.

⁴ "Devising and Implementing Programs for More Effective Utilization of Renewable Resources", Proceedings, Resources for Tomorrow Conference, Recreation Workshop "B", Vol. III, Ottawa: Queen's Printer, 1962, pp. 179-189.

⁵ National Parks Policy, National Parks Branch, Department of Northern Affairs and National Resources, Ottawa: The Department, 1964, p. 3.

⁶ Ibid.

of custom falls off his back with the first step he makes into these precincts.”¹

The visits to the national parks — and this may be taken as indicative of a similar pattern found in provincial parks — have increased rapidly as shown by the attendance figures:²

| Fiscal Year | Visitor Attendance |
|-------------|--------------------|
| 1953-54 | 2,857,268 |
| 1963-64 | 9,426,857 |

Attendance figures alone, however, give no information of the actual use being made of the parks because the figures include the substantial number of those who drive through the park, possibly without ever leaving their car. Camping being the activity most closely related to the basic purposes of the parks, the figures on camping are more pertinent to the use of the parks for healthful recreation. These figures too have increased very substantially, as shown below for the national parks:³

| Fiscal Year | Campers | Camper Days |
|-------------|---------|-------------|
| 1953-54 | 69,311 | 373,506 |
| 1963-64 | 790,775 | 2,105,992 |

All these figures include not only Canadians but also tourists from other countries; on the other hand they take no account of similar activities by Canadians outside the country.

National and provincial parks, as well as municipal parks with their playgrounds constitute a considerable, yet perhaps still inadequate, investment in health resources. It is now vaguely recognized that they perform a major function in the maintenance and restoration of physical and mental health, but it would appear to be worthwhile to study more fully the uses made of the various types of parks and their facilities, and to determine their effects on health.

Marion Clawson, in reviewing the use made of recreation areas in the United States and Canada, estimates the annual increase in recreation use to amount to about 10 per cent.⁴ Referring to the situation in both countries, he aptly summarizes the reasons for the increase as follows:

“The basic factors behind the growth in outdoor recreation activity are the same in the two countries. Total population is rising in each, at the rate of roughly 2 per cent annually, or a little less in our case. Each of us is getting a higher proportion of our population in age brackets which normally consume more recreation, and each of us is getting to be more urbanized. City people seem to participate in outdoor recreation more than rural people. In each country, real income per capita is

¹ Emerson, R.W., *Essays*, New York: P.F. Collier & Son, pp. 329, 330.

² Data supplied by the Department of Northern Affairs and National Resources.

³ *Ibid.*

⁴ Clawson, M., “Planning and Managing a System of Parks for a Nation”, *Proceedings, First Federal-Provincial Parks Conference, Ottawa, 1962, Appendix II, pp. 28-35.*

rising; and with larger total incomes, a larger proportion is discretionary income, of which a larger proportion is spent for recreation. In each country there is also a rising amount of leisure. There are more young people who have not yet entered the labour force; there are more older retired people in reasonably good health, and the average work week is gradually being reduced.... In our case, and I presume in yours, the rise of the paid vacation since the war has been a major factor making it possible for ordinary working men to have an annual vacation and many such vacations are spent out of doors. Another major factor, common to both countries, has been the very great improvement in transportation facilities. Roads today are infinitely better than they were a generation ago, and much better than even a decade ago. Automobile ownership is nearly universal, and the family auto is basic to outdoor recreation.”¹

There is every indication that all these factors making for an increased demand on outdoor recreational facilities will continue to intensify. The observation that city people participate more in outdoor recreation than rural people would seem to be saying the obvious. It is important, however, not only because of the continuing trend towards urbanization but also because the rural way of life is becoming more and more urbanized. This applies to the work as well as to leisure time activities. For one thing, more and more rural residents have jobs in the towns and cities. For those remaining in agricultural pursuits, the work becomes increasingly mechanized, working hours are more regular than they used to be allowing for more leisure time, and the leisure time pursuits have come to resemble those of the city dweller, with radio and television replacing some of the social activities typical to the rural setting. Improved transportation facilities make it easier for rural residents to participate in leisure time activities in urban centres rather than locally. Thus, even rural life is no longer necessarily synonymous with physical activity and being in close accord with the natural environment.

As a means of maintaining or regaining physical and mental health, parks and their use are as difficult to evaluate and to assess quantitatively as many other means of prevention and rehabilitation particularly in the field of mental health. Proposals for studies into this aspect² should be given every possible support.

There are hopeful signs that recreation and relaxation per se are becoming respectable. The kind of idleness which Bertrand Russell praises³ as providing the opportunity for contemplation and for which nature provides such an effective setting is still not generally acceptable, however. It is still true, as Emerson said,⁴ that people do not like to indulge in relaxation and contemplation as such “without the apology of some trivial necessity such as going to see a wood lot, or to look at the crops, or to fetch a plant or a mineral from a remote locality, carrying a fowling-piece or a fishing rod”. All these are acceptable reasons, rest

¹ Ibid.

² Taylor, G.D., *Recreational Research Needs in Canada*, paper presented to the Research Committee, The Conservation Council of Ontario, Toronto, March 11, 1964.

³ Russell, B., *In Praise of Idleness*.

⁴ Emerson, R.W., *op. cit.*

alone is not. This supports the aforementioned pressures on public parks administrations for greater commercialization. Yet, urbanization of the parks seems not to be favoured by those who visit them. The National Parks Branch of the Department of Northern Affairs and National Resources has been carrying out some research into the objectives of public parks as seen by their users. The preferences of visitors to the Fundy National Park may have general application:

“It is apparent that campers prefer relatively passive recreations and that the most popular activities are those that generally fit into the category of outdoor recreations considered to be appropriate to large resource based parks. Only one of these activities, swimming, requires elaborate constructed facilities at Fundy.¹..... The urban style recreations that require special facilities and equipment are used by relatively few campers.”²

Rest and relaxation rank prominently among the “activities” favoured by campers,³ and the main reasons given for camping, apart from it being an economical holiday, are: 1) “Like being outdoors”, 2) “relaxation”, 3) “good place to bring children”, and 4) “change from city life”.⁴ Though given in this order, it will be noted that all of these reasons really amount to a desire for change from city life.

The role of parks in the maintenance of health and well-being as well as the future needs of an increasingly urbanized population must be more fully studied in the light of the rapidly growing use of park facilities. The land set aside for parks is unevenly distributed: the central provinces with 63 per cent of the population have less than one per cent of the national park area, and southern Ontario with 90 per cent of the province’s population has only 5 per cent of its park area.⁵ But this is natural because large natural park areas must needs be remote from densely populated regions, and they should be located where the necessary natural features can be found. The Fundy National Park, for instance, draws its visitors primarily from the remote but heavily urbanized areas of the northeastern United States and of central Canada, with the home province, New Brunswick, contributing less than 10 per cent of the camper use.⁶

Parks serve to provide the opportunity for recreation and relaxation in a natural environment. We have spoken of the organizations encouraging physical fitness by maintaining physical activity which is otherwise lacking in the modern way of life. All these activities are expanding but they need more systematic and purposeful planning and operation, as well as the necessary understanding on the part of the public. Closer association with health planning and the national fitness programme may be one way of achieving that goal.

¹ Not necessarily in other parks.

² Taylor, G.D., “The Visitor to Fundy National Park, 1964”, Recreational Research Report No. 14, Planning Division, National Parks Branch, Ottawa, 1965, p. 11.

³ Ibid., p. 10.

⁴ Ibid.

⁵ Baker, W.M., “Assessing and Allocating Renewable Resources for Recreation”, Background Papers, Resources for Tomorrow Conference, Vol. II, Ottawa: Queen’s Printer, 1962, p. 982.

⁶ Taylor, G.D., op. cit., p. 3.

Habits

People's way of life involves many aspects which in one way or another affect their health. In some instances these effects may be small and indirect, in others they are not fully known or explored. Also, our notions are not static. This applies to drug addiction and drunkenness and also to common crime and even to people's attitudes towards peace or war. In regard to delinquency, Bovet said that "consideration of all the facts known today leads to the conclusion that delinquency is a 'bio-psycho-social phenomenon' in the words of Lafon (in a work in press). No one who wishes to gain an insight into the causes of social maladjustment and of one of its consequences, juvenile delinquency, can afford to neglect any one of the three terms of his expression".¹ But then, the author cautions that it must be remembered that he is a psychiatrist, approaching the problem from a psychiatric and psychological angle.² He also refers to differences in the interpretation among psychiatrists themselves. The relative part played in the causation of social maladjustment and asocial behaviour by each of the three factors probably also varies in degree in different types of such behaviour, adding to the difficulty in determining the health factor in crime.

Having spoken of work, leisure, and social adjustment, some reference must be made to the everyday habits of individuals which, though mostly very inconspicuous, may nevertheless substantially affect their health. Thus, what people wear will either protect or jeopardize their health. This refers primarily to protection from cold or heat, but particular fashions, like some forms and shapes of ladies' shoes, may also imply certain specific health hazards.

More directly associated with health and disease, however, and more thoroughly studied, are eating, drinking, and smoking habits.

Nutrition

What we eat and drink constitutes our nutrition, i.e., a "series of processes by which an organism takes in and assimilates food for promoting growth and replacing worn or injured tissues"³ Nutrition thus forming the process which is basic to the day-to-day maintenance of the body, it is surprising that it is so little thought of this way by so many people. Perhaps because it is so basic, the food intake has become almost automatic, somewhat like the functioning of the involuntary organs of the body of whose presence we are hardly aware during their normal functioning.

If in many areas of the world the problem is one of providing enough of the basic foodstuffs – a problem still far too prevalent also in Canada – a major problem here has become the selection of foodstuffs which best serve the

¹ Bovet, L., *Psychiatric Aspects of Juvenile Delinquency*, Monograph Series I, Geneva: World Health Organization 1951, p. 41.

² *Ibid.*, p. 42.

³ Webster's New World Dictionary, College Edition, Toronto: Nelson, Foster and Scott Ltd., 1960, p. 1009.

purpose of nutrition, and often the question is one of too much rather than too little. In primitive situations man has usually developed, either instinctively or by trial and error, a nutritional regimen selecting from the available foodstuffs those which best served the purposes of nutrition. Progressing civilization, however, has brought with it attitudes which regard eating as an end in itself and a social function rather than a matter of providing the necessary nutrients to the body. On the other hand, we have developed a vast body of scientific knowledge of nutritional needs, which can provide sufficient guidance for determining the kind and quantities of food required. Even if some of this knowledge is not firmly established, its application can prevent damage from gross aberrations. The aberrations may be grouped into three types:

- (a) too little food,
- (b) too much food,
- (c) the wrong kind of food.

The effects of too little or too much food can be aggravated by also using the wrong kind of food. All three types of malnutrition may occur in Canada. As long as there is poverty, there is, even with welfare measures, the risk that people and especially children will go without adequate food. Overweight and obesity¹ have become diseases of plenty and of the progressive use of labour-saving machines and devices at work, home, and recreation. Ignorance or indifference are the causes of the wrong kind of food consumed.

The prevalence of any of these types of malnutrition in Canada is not known. This is one of the many important aspects of the health status of Canadians where as yet no systematic effort has been made to appraise the situation. What information exists on the nutritional status is the result either of limited studies or estimates of the general pattern of food consumption which, however, reveals nothing about the actual distribution of food consumption.

Table 6 shows the estimated amounts of food consumed in Canada on a per capita basis.

Regarding the quantities of food consumed as shown in the table, it should be noted that the calculations are made at the retail stage and that the amount of food actually eaten would be somewhat lower because of losses and waste at the consumer level. Furthermore, these patterns are also subject to short-term fluctuations due to the price and supply situation. An increase in sugar prices, for instance, will tend to reduce consumption; smaller potato crops and greater exports will have a similar effect. The following chart (Figure 5) illustrates such fluctuations between two recent years.

Yet, as pointed out, these per capita averages give no insight into the actual food intake of individuals which may well be inadequate in many cases. Canada's nutrition problems have been summarized as follows:

¹ Overweight meaning more than 10 per cent above the "normal" weight for height and age, obese more than 20 per cent above "normal". (McHenry, E.W., and Beaton, G.H., *Basic Nutrition*, Philadelphia: J.B. Lippincott Co., 1963, p. 284.)

In spite of an adequate supply of food and nutrients at the national level we still have a small number of infants and young children admitted to hospital with rickets due to vitamin D deficiency or scurvy due to vitamin C deficiency. A significant minority of children are underweight and apparently underfed. An impressive proportion of Canadians are sufficiently overweight to impair health and efficiency. Food habit surveys repeatedly suggest that food selection at all age levels can be appreciably improved.¹

TABLE 6
PER CAPITA SUPPLIES OF FOOD MOVING INTO CONSUMPTION,
CANADA, 1951 AND 1961

| Food | Pounds | | |
|------------------------------|------------------------------------|-----------------------------------|---|
| | Per Capita Average 1950–1951 | Per Annum Average 1960–1961 | Percentage Change from 1950–51 to 1960–61 |
| Cereals | 172.2 | 152.8 | –11.3 |
| Potatoes | 166.6 | 144.6 | –13.2 |
| Sugars and syrups | 105.6 | 104.5 | –1.0 |
| Starch..... | 1.6 | 1.6 | 0 |
| Pulses and nuts | 12.8 | 10.1 | –21.1 |
| Fruit..... | 191.8 | 237.7 | +23.9 |
| Vegetables | 91.6 | 109.8 | +19.9 |
| Oils and fats..... | 43.8 | 44.5 | +1.6 |
| Meat..... | 133.7 | 144.9 | +8.4 |
| Poultry and fish..... | 26.2 | 34.5 | +31.7 |
| Eggs..... | 34.6 | 36.2 | +4.6 |
| Milk and cheese | 64.7 | 66.8 | +3.2 |
| Beverages (tea, coffee)..... | 9.7 | 9.6 | –1.0 |

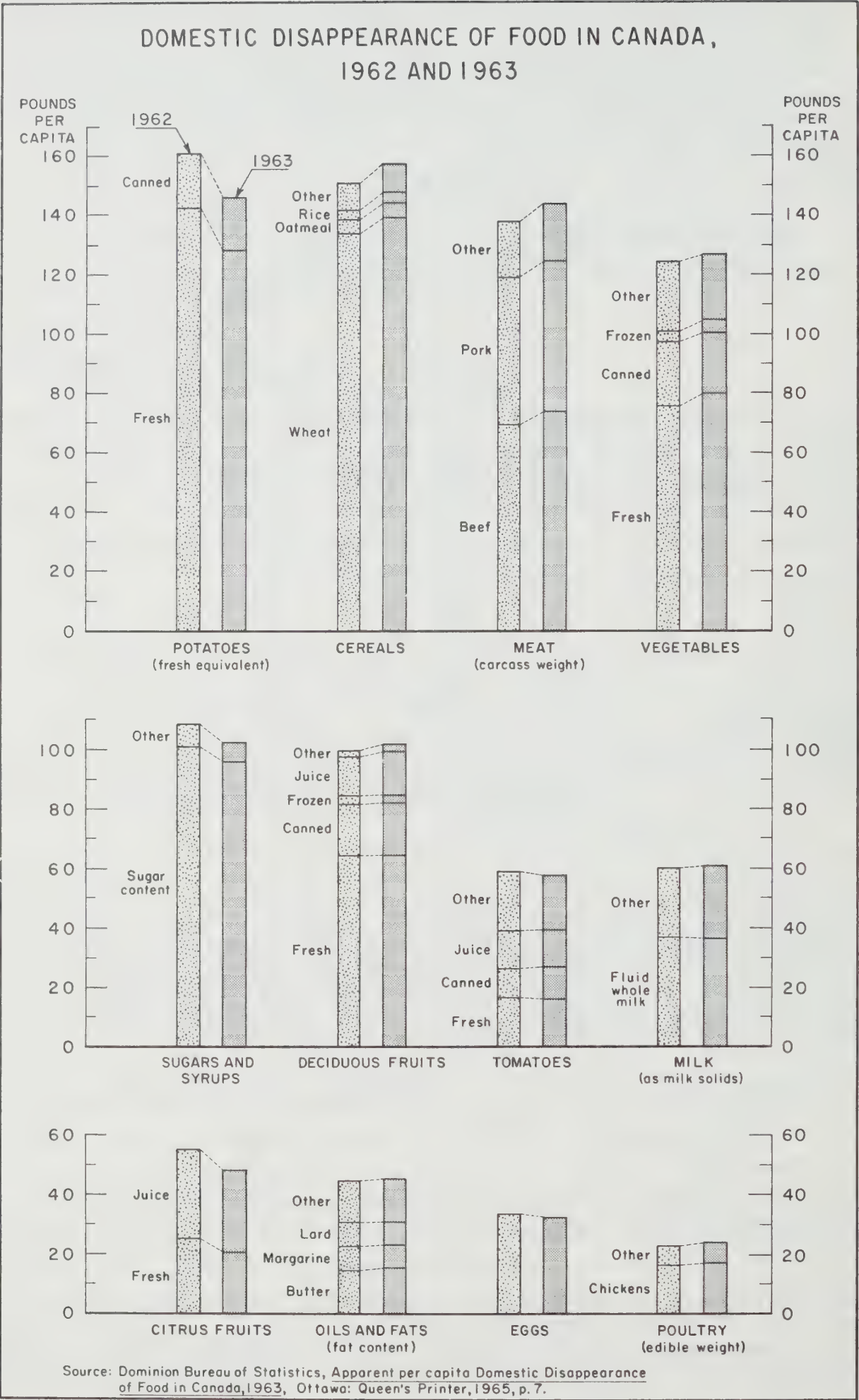
Source: Based on Dominion Bureau of Statistics, Canada Year Book 1954 and 1963-64, Ottawa: Queen’s Printer, 1954 and 1964, pp. 434-435 and 473-474 respectively; and information supplied by the Dominion Bureau of Statistics.

That families in poor circumstances are handicapped in their purchases of food² is obvious. It is the more important then that these families be provided with the information and motivation necessary to use their limited resources in the most effective way with a view to deriving optimal nutritional values from the limited supply. An example of the variation of food intake with family income is given by McHenry from an old study on the use of protein foods.³

| Family Income | Per Capita Total Milk Intake (Pints) |
|---------------------------|--------------------------------------|
| On government relief..... | 0.54 |
| Under \$1,000 | 0.69 |
| \$1,000 – 2,000..... | 0.76 |
| \$2,000 – 4,000..... | 0.81 |
| \$4,000 and over..... | 0.95 |

¹ Beaton, G.H., Milne, H., Nutrition Today, paper presented at the Annual Meeting of the Canadian Home Economics Association, Winnipeg, July 9, 1964, p. 7.
² McHenry, E.W., op. cit., p. 331.
³ Ibid., p. 330.

FIGURE-5



An expert committee under United Nations auspices arrived at the following conclusion regarding nutrition problems anywhere in the world:

The association of poor nutrition with low economic status, often closer in urban and semi-urban than in rural areas, is fully recognized. Of special significance in rural areas may be excessive reliance on cash crops and the tendency on the part of poor cultivators to sell certain kinds of nutritious foods, in order to obtain ready money, rather than to use them at home.¹

Specific problems exist, or have existed, in Canada in areas where low cash income is combined with a lack, at the local level, of essential foods. Examples are Newfoundland before Confederation, and the indigenous population groups in the North. Family income is not the only criterion for the adequacy of the food budget: family size is also very important and surveys have shown that as family size increases, fewer families meet the recommended allowances.² Studies in Canada and the United States suggest that there is considerable room for improvement in the food habits of children and teenagers. Studies of teenage eating in Ontario³ found poor or very poor diets in over 50 per cent of the survey group, the percentages being lower (39 per cent) among males and higher among females (69.5 per cent). The neglect of milk was found to be quite serious. And it appears that teenage girls, when reducing, eat less without ensuring that the food they do eat contains the needed nutrients. "Great emphasis should be placed on the protective foods as dependable sources of nutrients", the study concludes.⁴ But the diet of teachers, too, seems to leave much to be desired according to a survey in Scarborough, Ontario.⁵ These Ontario findings are likely to apply in other parts of Canada as well.

"Among Canadian adults, the main nutritional problem today is obesity."⁶ It is estimated that among them 13 per cent of the men and 23 per cent of the women are obese,⁷ but overweight has become more prevalent among men and less prevalent among women in the United States.⁸ Among the obese, deaths from certain causes exceed the expected number; this is shown here for selected causes among the age group 25-74:⁹

¹ World Health Organization, Joint FAO/WHO Expert Committee on Nutrition, Technical Report Series 72, Geneva, 1953, p. 9.

² Beaton, G.H., Milne, H., *op. cit.*, p. 9.

³ Trenholme, M., Milne, H., "Studies of Teenage Eating in Ontario, I. Evaluation of Teenage Food Selection", *Canadian Journal of Public Health*, October 1963, p. 461.

⁴ Milne, H., et al., "Studies of Teenage Eating in Ontario, II. Evaluation of a Diet Scoring Method", *Canadian Journal of Public Health*, October 1963, pp. 469, 470.

⁵ As quoted in Beaton, G.H., Milne, H., *op. cit.*, p. 13.

⁶ *Ibid.*, p. 11.

⁷ Pett, L.B., "Report on Canadian Average Weights, Heights, and Skinfolds", *Canadian Bulletin of Nutrition*, 1957, No. 1.

⁸ McHenry, E.W., *op. cit.*, p. 328.

⁹ Hawkins, W.W., "Some Medical and Biological Aspects of Obesity", *Canadian Journal of Public Health*, October 1963, p. 477 (based on a survey by the Metropolitan Life Insurance Company).

| Cause of Death | Per Cent Actual of Expected Deaths among Obese | |
|-------------------------------------|---|-------|
| | Men | Women |
| Diabetes mellitus | 383 | 372 |
| Cirrhosis of the liver | 249 | 147 |
| Biliary calculi..... | 206 | 284 |
| Cardiovascular-renal diseases | 149 | 177 |
| Cancer | 97 | 100 |

In many of the cases of inadequate intake of nutrients the problem is a lack of knowledge or motivation as much as of unavailability. The latter is being overcome by the improved means of transportation and storage. Health education has a major role to play here, as well as the distribution of dietary supplements where needed. Even among the marginal income groups, it must be remembered that “often money can be saved by buying foods of greater nutritive value than those commonly used”.¹ Greater effort in this field is warranted in view of the fact that nutrition may well stand out “as the single most important factor”² in health maintenance and restoration.

Canada’s Food Guide, prepared by the Department of National Health and Welfare, provides a scientifically designed guide to a balanced diet allowing for a wide range of budgets.

No account of the nutritional state of Canadians would be complete without mention of the public health activities directed towards ensuring the safety and quality of the foodstuffs reaching the consumer. This protection, too often taken for granted, is provided by the food inspection and laboratory services of the Food and Drug Directorate of the Department of National Health and Welfare which administers the Food and Drugs Act.

Closely related to nutrition, or actually part of the “processes by which an organism takes in and assimilates” substances, are such other activities and habits as the intake of alcohol, drugs, and tobacco, all of which become health problems when exceeding certain levels. The same can be said, of course, of certain components of our daily diet such as sugar or saturated fats, although the role of the latter is still a matter of controversy. The reason for singling out alcohol, drugs, and tobacco is that they are habit forming to a greater extent than other substances, that the consequences are generally more serious and better known, and that some create social problems in addition to being health hazards.

The actual cumulative effect of their habits on the health of Canadians is reflected in the statistics presented in the following chapters. In the context of the characteristics of people and their environment, we are mainly concerned with the extent and the trend of such habits.

¹ McHenry, E.W., op. cit., p. 333.
² Stare, F.J., “Why the Science of Nutrition”, Nutrition Reviews, January 1950, p. 4.

Alcohol

When talking of alcohol consumption and its patterns in Canada it should be made clear at the outset that the use of alcoholic beverages is not synonymous with alcoholism. The latter constitutes a pathological condition which is estimated to be present in about 3 per cent of all Canadians who do use alcoholic beverages.¹ And two-thirds of the adult population are estimated to be drinkers.² It is obvious from these statements that the difference between the occasional user of alcohol and the alcoholic is often one of degree, the latter in many cases developing gradually from the former. According to the definition by the World Health Organization, alcoholics are:

“Those excessive drinkers whose dependence on alcohol has attained such a degree that it shows a noticeable mental disturbance or an interference with their bodily or mental health, their interpersonal relations and their smooth economic and social functioning.”³

Canadians, on the whole, are spending more on alcoholic beverages and they are consuming more than they used to. Consumer expenditure on alcoholic beverages has risen by 50 per cent from \$626 million in 1952 to \$938 million in 1961.⁴ The increase in expenditure is due partly to price increases and partly to increased population. The actual per capita consumption also shows increases during the same ten-year period for spirits and wine, accompanied by a small decrease for beer; following are the per capita sales for the adult population (20 years and over) in gallons for the corresponding period:⁵

| | <u>1952 – 1953</u> | <u>Fiscal Year</u> <u>1961 – 1962</u> |
|--------------|--------------------|--|
| Spirits..... | 1.16 | 1.33 |
| Wine | .56 | .75 |
| Beer | 21.74 | 21.15 |

Spirit sales have increased by 15 per cent, wine by 34 per cent, and beer sales per capita have declined by 3 per cent, but this small change may be due to chance fluctuation. While spirits accounted for 5 per cent of the total in 1952-1953, they constituted 6 per cent of the somewhat smaller total consumption in 1961-1962. But again averages do not tell the whole story and do not indicate the extent to which drinking has become a health problem. If the actual distribution were anywhere near the average, it would mean a one-ounce drink and a pint

¹ The Canadian Council on Alcoholism, brief submitted to the Royal Commission on Health Services, Toronto, 1962, p. 1.

² Alcohol Studies Guide, Alcoholism and Drug Addiction Foundation and the Department of Education, Ontario; Toronto, 1961, p. 7.

³ Expert Committee on Mental Health. Alcoholism Subcommittee. Technical Report Series, No. 48, Geneva: World Health Organization, 1952.

⁴ Dominion Bureau of Statistics, National Accounts 1926-1956, Ottawa: Queen's Printer, 1958, p. 89, and National Accounts 1963, Ottawa: Queen's Printer, 1964, p. 54.

⁵ Based on sales figures supplied by the Dominion Bureau of Statistics, and the population (20 years and over) for 1952 and 1961.

of beer for every adult every other day. In Ontario, for example, beer contains 5 per cent alcohol by volume whereas whisky contains 40 per cent.¹ While the per capita figures indicate the general increase in sales over the years, they obscure the actual pattern of consumption. It must be remembered that an estimated one-third of the adult population do not drink² so that their "share" would have to be added to those who do drink. Others drink only moderately and "socially", whereas the aforementioned 3 per cent of those using alcoholic beverages are alcoholics according to the definition. In these cases, the progression from occasional or social drinking to alcoholism is often a gradual one, varying from individual to individual, and with the circumstances. Within this progression and for the typical case of alcoholism in North America, several steps have been identified, with the following consecutive stages: 1 – social drinker, 2 – heavier drinking, 3 – blackout, 4 – loss of control, 5 – excuses for helpless drinking, 6 – anti-social, lone drinking, 7 – acute hangovers, morning drinking, 8 – benders, 9 – chronic alcoholism with complications.³

The actual number of alcoholics can only be estimated and the accepted basis for such estimates is the formula developed by Jellinek,⁴ which is based on the number of deaths from cirrhosis of the liver. It is thus estimated that the rate of alcoholics per 100,000 population in Canada has been as follows during a recent decade.⁵

| | |
|------|-------|
| 1951 | 1,520 |
| 1952 | 1,580 |
| 1953 | 1,665 |
| 1954 | 1,700 |
| 1955 | 1,730 |
| 1956 | 1,870 |
| 1957 | 2,010 |
| 1958 | 2,060 |
| 1959 | 2,120 |
| 1960 | 2,190 |
| 1961 | 2,170 |
| 1962 | 2,125 |

Based on this estimate, there would be between 200,000 and 300,000 alcoholics in Canada as of 1961.

The slight drop in the rates for two consecutive years in 1961 and 1962 indicates a levelling off rather than a chance fluctuation.

¹ Alcohol Studies Guide, op. cit., p. 16.

² Ibid., p. 7.

³ Ibid., p. 23, quoting E. M. Jellinek.

⁴ Expert Committee on Mental Health. Alcoholism Subcommittee. Technical Report Series No. 42, Geneva: World Health Organization 1951, pp. 21-24.

⁵ Alcoholism and Drug Addiction Research Foundation of Ontario, Twelfth Annual Report, Toronto, 1963, p. 82, and Fourteenth Annual Report, Toronto, 1965, p. 93.

It has been said of an apparent rise in the incidence of alcoholism in the United States that it may be due to better reporting of cirrhosis of the liver as a cause of death;¹ there is less concern about the stigma attached and diagnostic procedures have been improving. These factors may account for part of the increase in the prevalence figure but other indicators point towards a real increase or at least a continuing high level of the problem.

The following tabulation shows the apparent annual alcoholic beverage consumption (in gallons of alcohol per capita of the population 15 years and over) in Canada for the period 1951 to 1961:²

| | |
|------|------|
| 1951 | 1.47 |
| 1952 | 1.46 |
| 1953 | 1.50 |
| 1954 | 1.51 |
| 1955 | 1.44 |
| 1956 | 1.51 |
| 1957 | 1.53 |
| 1958 | 1.56 |
| 1959 | 1.54 |
| 1960 | 1.58 |
| 1961 | 1.59 |

By 1963, the amount was up to 1.64 gallons.³ These gallonage figures express the amount of absolute alcohol contained in the beverages consumed.

The per capita figures, as noted before, do not in themselves reflect the extent of alcoholism. The frequency of alcoholism depends upon the distribution of the amounts consumed and probably also the source⁴ of the alcohol and hence the way it is consumed. An international comparison among selected countries illustrates this point. The following figures give the corresponding per capita consumption for the latest available year in the respective countries:⁵

| | |
|----------------|------|
| France | 5.87 |
| Italy | 3.25 |
| United States | 1.61 |
| <u>Canada</u> | 1.59 |
| United Kingdom | 1.25 |
| Sweden | 1.07 |

Yet, when these countries are ranked in terms of their estimated rate of alcoholics in the population, the result is quite different:⁶

¹ Keller, M., "Alcoholism: Nature and Extent of the Problem"; *The Annals of the American Academy of Political and Social Science*, January 1958, pp. 1 -11.

² Alcoholism and Drug Addiction Research Foundation, *Twelfth Annual Report*, Toronto, 1963, p. 76.

³ Alcoholism and Drug Addiction Research Foundation, *Fourteenth Annual Report*, Toronto, 1965, p. 87.

⁴ Whether from beer, wine, or spirits.

⁵ Alcoholism and Drug Addiction Research Foundation, *Twelfth Annual Report*, Toronto, 1963, p. 77.

⁶ *Ibid.*, p. 82.

| | | |
|---------------|---|---------------|
| High range: | | |
| extreme | — | France |
| upper | — | United States |
| lower | — | Sweden |
| Middle range: | | |
| upper | — | Canada |
| lower | — | England |
| | | Italy |

While Italy, for instance, ranks second to France in terms of per capita consumption, it has a considerably lower rate of alcoholics. These two countries vary considerably in the proportional share of the three main sources of alcohol, namely beer, wine, and spirits, as indicated below:¹

| Country | Percentage of Total Per Capita Alcohol Consumption Derived from: | | | |
|---------------------|---|------|------|---------|
| | Total | Beer | Wine | Spirits |
| | % | % | % | % |
| France..... | 100.0 | 12.5 | 75.5 | 12.0 |
| Italy..... | 100.0 | 1.5 | 91.0 | 7.5 |
| United States..... | 100.0 | 48.5 | 11.0 | 40.5 |
| Canada..... | 100.0 | 62.0 | 7.0 | 31.0 |
| United Kingdom..... | 100.0 | 81.0 | 4.0 | 15.0 |
| Sweden..... | 100.0 | 24.0 | 11.0 | 65.0 |

The rate of first admissions for alcoholism² to mental institutions in Canada has risen from 8.7 in 1952 to 32.4 in 1962.³ This spectacular increase, however, must be ascribed partly at least to more effective treatment methods available in the institutions, stronger motivation to seek treatment, and less stigma attached to alcoholism as a diagnosis.

Who are the alcoholics and what are their characteristics? The figure of 200,000 to 300,000 alcoholics in Canada is an estimate based on calculations and not on existing records or registers; as a result, nothing is known of the individuals comprising this group as a whole. A study undertaken in Ontario⁴ reveals the following distribution of alcoholics among selected population groups:

- 1) Nine-tenths still have some normal social and/or family ties and are rarely if ever involved with the law.
One-tenth are in the “skid row” population of chronic drunkenness offenders.

¹ Ibid., p. 77.

² For instance, alcoholism with and without psychosis, rate per 100,000 population aged 20 years and over.

³ Alcoholism and Drug Addiction Research Foundation, Twelfth and Fourteenth Annual Reports, Toronto, 1963 and 1965, pp. 80 and 92 respectively.

⁴ Based on: Alcoholism and Drug Addiction Research Foundation, Fourteenth Annual Report, Toronto, 1965, p. 11.

- 2) Five-sixths are male and one-sixth female. This ratio is similar to that estimated to exist in the United States¹ and somewhat higher than the 4:1 ratio among institutionalized cases as shown below.
- 3) Two-thirds are between the ages of 30 and 54, one-fifth being older and one-tenth younger. Among hospitalized alcoholics the concentration in this age group appears somewhat higher but the respective age groups, as shown below, are not exactly comparable.

In the general population, the age group 30-54 accounts only for about one-third of the total, indicating the high prevalence ratio of alcoholism in this age group as compared with the other age groups.

- 4) Five-sixths are urban, one-sixth rural. Since in the general population the urban element accounts for only about 77 per cent, the above figure indicates the relatively higher incidence of alcoholism in the urban centres.
- 5) Five-eighths have Grade VIII education or less, three-eighths some high school or university. The five-eighths in the former group compare with about three-eighths among the general population, indicating a relatively higher incidence in the lower education group.
- 6) One-half are fully employed, the remainder being wholly or partly unemployed or not in the labour force at all. Comparisons with the distribution among the general population of labour force age indicate the higher prevalence of alcoholism among the wholly or partly unemployed. This raises the interesting problem of a possible cause-and-effect relationship between unemployment and alcoholism.

Relatively lower proportions of alcoholics are found in the professional and technical, the clerical, the service and recreational occupation groups, which supports the findings in regard to education (see item 5).

- 7) One-half are periodic drinkers who tend to "lose control" each time they start to drink. One-fifth are "inveterate" drinkers who may not often become intoxicated but who cannot remain abstinent without physical reaction. Three-tenths represent miscellaneous complications.

So much for the epidemiology of alcoholism generally. Of the comparatively small proportion of alcoholics who are in institutions we know little, except their age and sex. Other characteristics of the institutionalized population are not routinely tabulated and published by diagnosis but this can probably be hoped for in the future as more use is being made of electronic data processing.

On December 31, 1962, there were 1,814 alcoholic patients in institutions reporting to the Dominion Bureau of Statistics: that is less than one per cent of the estimated number of alcoholics in Canada and not necessarily representative

¹ Keller, M., *op. cit.*

of that group. During 1962, a total of 3,477 alcoholic first admissions to institutions was reported. Among the hospitalized cases the sex ratio is about four males to one female:¹

| Diagnosis | Both Sexes | Male | Female |
|------------------------------------|------------|------|--------|
| | % | % | % |
| Patients in Institutions | | | |
| Alcoholism with psychosis | 100.0 | 76.5 | 23.5 |
| Alcoholism without psychosis | 100.0 | 79.9 | 20.1 |
| First Admissions | | | |
| Alcoholism with psychosis | 100.0 | 83.7 | 16.3 |
| Alcoholism without psychosis | 100.0 | 84.0 | 16.0 |

Of the 937 alcoholics without psychosis in institutions at the end of 1962, 84 per cent were diagnosed as chronic.

Age-wise, the alcoholic patients are distributed as follows:

| | All | Age | | | | | | | | |
|------------------------------------|------|------|-------|-------|-------|-------|-------|-------|-------|-----|
| | Ages | 0-19 | 20-29 | 30-39 | 40-49 | 50-59 | 60-69 | 70-79 | 80-89 | 90+ |
| | % | % | % | % | % | % | % | % | % | % |
| Patients in Institutions | | | | | | | | | | |
| Alcoholics with psychosis | 100 | .. | 1 | 9 | 18 | 33 | 28 | 10 | 1 | .. |
| Alcoholics without psychosis | 100 | .. | 4 | 23 | 31 | 24 | 13 | 4 | 1 | .. |
| First Admissions | | | | | | | | | | |
| Alcoholics with psychosis | 100 | .. | 8 | 26 | 30 | 23 | 10 | 2 | 1 | .. |
| Alcoholics without psychosis | 100 | .. | 7 | 29 | 34 | 22 | 7 | 1 | .. | .. |

They are concentrated in the age group between 30 and 60, which accounts for about 80 per cent of the total cases. It is the same age group which also shows the highest ratio of patients per 100,000 population.

It is noteworthy that in 1962 the great majority of alcoholic patients discharged were classified as either recovered or improved. Of the 6,638 discharges, 86 per cent were considered recovered, much improved, or improved.

¹ The statistics on alcoholics in institutions are based on Dominion Bureau of Statistics, Mental Health Statistics, Vol. I and II, Ottawa: Queen's Printer, 1964 and 1965.

In 1962, alcoholic admissions accounted for about one-tenth of all admissions to mental institutions. The average length of stay was 1.4 months for alcoholics without psychosis, and 3.5 months for alcoholics with psychosis.

The consequences of excessive drinking may, under certain circumstances, constitute offenses under the Criminal Code and various other laws. Generally speaking, conviction rates¹ for such infringements levelled off in 1961 as compared with the previous decade,² but the picture is not uniform. The absolute number of convictions³ for drunkenness has increased between 1956 and 1961 but no definite trend is discernible when these numbers are related to the growing population:

| Year | Convictions ⁴ | |
|------------|--------------------------|------------------------|
| | Number | Per 100,000 Population |
| 1956 | 101,812 | 633 |
| 1957 | 110,162 | 663 |
| 1958 | 106,990 | 626 |
| 1959 | 105,498 | 603 |
| 1960 | 109,327 | 611 |
| 1961 | 120,739 | 662 |

On the other hand, driving offenses related to alcohol have shown an almost steadily rising trend over the same five-year period, even when related to the population increase. While the number of vehicles has also increased, the fact remains that the incidence of law infringements of this kind has gone up. The following tabulation shows the total number of convictions (both indictable and non-indictable) under the Criminal Code based on article 222 (driving while intoxicated) and article 223 (driving while ability to drive is impaired):⁵

| Year | Convictions | |
|------------|-------------|------------------------|
| | Number | Per 100,000 Population |
| 1956 | 17,410 | 108 |
| 1957 | 19,370 | 117 |
| 1958 | 19,409 | 114 |
| 1959 | 20,733 | 119 |
| 1960 | 23,420 | 131 |
| 1961 | 25,286 | 139 |

¹ Applied to 100,000 population aged 15 and over, and in the case of driving offenses expressed per 100,000 vehicles.

² Alcoholism and Drug Addiction Research Foundation, Twelfth and Fourteenth Annual Reports, Toronto, 1963 and 1965, pp. 79 and 91 respectively.

³ Based on data supplied by the Dominion Bureau of Statistics. Figures include convictions based on: Criminal Code (Act 160 a2), municipal bylaws, Liquor Control Acts, Indian Act on Intoxication. They exclude convictions based on articles 222 and 223 of the Criminal Code, which are shown below.

⁴ Ibid.

⁵ Based on data supplied by the Dominion Bureau of Statistics.

That much we know about the excessive use and users of alcohol. Somewhat more is known of the distribution and characteristics of drinkers, i.e., those who use alcoholic beverages regardless of how much or how little. In perusing these statistics, it must be remembered, therefore, that neither drinking as such nor even drunkenness are synonymous with alcoholism.

Table 7 indicates that the percentage of people using alcohol has not changed very much in recent years and that the use is fairly evenly prevalent among the various groups identified in the table. In 1958, the latest year shown, the proportion of drinkers in all these groups varied only within the comparatively narrow range from 52 to 70 per cent. No matter what groups we look at — be it regions, sex, adult age, religion, education, community size, or occupation — we find that an estimated two-thirds of the people do at least some drinking.

In looking for ways of reducing alcoholism with all its consequences on the individual and society, it is interesting to note that legislation in all provinces is such that if it were effective there could be no alcoholism or even drunkenness. It may, in fact, come as a surprise to many how far the liquor laws go. The provision that “no person shall be in an intoxicated condition in a public place”¹ and the protection of minors are probably widely known, and also that no liquor shall be sold to “a person apparently under the influence of liquor”.² What may be even more striking is the provision that under the law no person shall:

- 1) “permit drunkenness to take place in a house or on any premises of which he is the owner, tenant or occupant,
- 2) “permit or suffer a person apparently under the influence of liquor to consume liquor in a house or on any premises of which the first named person is owner, tenant, or
- 3) “give liquor to a person apparently under the influence of liquor”.³

These articles are quoted from the Alberta Act but similar provisions exist in other provinces, in addition to the legislation for the protection of minors.

Once drunkenness becomes a problem in a person or he turns into the kind of alcoholic described above, there are provisions enabling a judge or magistrate to limit an individual's legal powers and activities if his alcohol addiction disables him from conducting his affairs, interferes with his family life or endangers his health. The Civil Code of the Province of Quebec, for instance, has legal provisions similar to those of other provinces for the interdiction of a habitual drunkard “who squanders or mismanages his property or places his family in trouble or distress, or transacts his business prejudicially to his family, his friends or his creditors, or who uses intoxicating liquors to such an extent that he hereby incurs the danger of ruining his health or shortening his life”.⁴

¹ Liquor Control Act: Revised Statutes of Alberta, 1955, c. 179, Art. 152 (2).

² Ibid., Art. 153.

³ Ibid., Art. 162.

⁴ Civil Code of the Province of Quebec, Chapter II A, Art. 336a.

TABLE 7

THE PERCENTAGE OF USERS OF ALCOHOLIC BEVERAGES IN VARIOUS SEGMENTS OF THE ADULT POPULATION, 1951 - 1958¹

| Population | 1951 | 1952 | 1955 | 1958 |
|------------------------------------|-------|-------|-------|------|
| | % | % | % | % |
| Canada | 64 | 70 | 72 | 65 |
| Region | | | | |
| Maritimes | 53 | 59 | 57 | 56 |
| Quebec | 65 | 71 | 69 | 57 |
| Ontario | 64 | 69 | 71 | 69 |
| Prairies and British Columbia | 65 | 75 | 81 | 70 |
| Sex | | | | |
| Male | 74 | 76 | 81 | 70 |
| Female | 54 | 64 | 62 | 60 |
| Age | | | | |
| 21-29 | 67 | 74 | 73 | 70 |
| 30-49 | 71 | 72 | 76 | 68 |
| 50 and over | 51 | 59 | 61 | 57 |
| Religious denomination | | | | |
| Roman Catholic | 65 | 71 | 73 | 62 |
| Protestant | 63 | 70 | 71 | 67 |
| Education | | | | |
| Less than high school | -- | 65 | 67 | 59 |
| High school and more | -- | 73 | 74 | 69 |
| Size of community | | | | |
| Farm | -- | 62 | -- | -- |
| Under 10,000 | -- | 67 | -- | -- |
| 10,000-100,000 | -- | 72 | -- | -- |
| Over 100,000 | -- | 76 | -- | -- |
| Occupation | | | | |
| Business and professional | -- | -- | 76 | 64 |
| Clerical and sales | -- | -- | 71 | 69 |
| Skilled and unskilled labour | -- | -- | 72 | 68 |
| Farmers | -- | -- | 66 | 58 |
| Others | -- | -- | 71 | 52 |
| Number of respondents | 2,017 | 1,689 | 1,887 | 678 |

¹ Based on the results of Canadian Institute of Public Opinion surveys, and provided through the kindness of Miss Byrne Hope Sanders, Director. Percentages indicate the proportion of respondents in stratified samples of the adult population (aged 21 and older) who replied in the affirmative to the first part of the question: "Do you ever have occasion to use any alcoholic beverage such as liquor, wine, or beer, or are you a total abstainer?".

Source: Alcoholism and Drug Addiction Research Foundation, *Fourteenth Annual Report*, Toronto, 1965, p. 89.

There also are the provisions of the provincial Highway Acts concerned with impaired driving and driving while under the influence of alcohol.

Prohibition, though generally accepted and largely successful in the case of narcotics, has failed where it had been tried against alcoholism. The difference

probably lies in the fact that, unlike narcotics, some use of alcoholic beverages is for many perfectly respectable and is harmless in small quantities; reference is often made to the regular use of wine as a beverage in many countries. Legal prohibition having proven unworkable, provincial legislation has been attempting to curb the excess. It is obvious that the provisions restraining the use of alcohol in private homes are difficult to enforce.

It thus remains contentious what effect, if any, some of the legislation has, including the laws regulating the sale of alcoholic beverages.

Religious and moral convictions have no doubt led many to abstain from the use of alcoholic beverages: about one-third of the adult population are estimated to refrain from using alcohol. But it appears to be firmly established now that further progress can be made and lasting success achieved only, as in the case of smoking, by an effective educational campaign. As the Honourable John Bracken recommended in a personal addendum to the exhaustive report of his commission inquiring into the use of alcoholic beverages in Manitoba in 1955:

“Make known the truth about liquor and thus explode the myths and folklore and unfounded propaganda on both sides of the liquor problem ... Maintain an informed public opinion based on the lessons of experience and the facts of science; a restoration of faith in what is said about liquor is overdue.”¹

It can only be hoped that those at whom this information is directed will be able to reconcile it with the exhortations in the advertising by the industry.

Smoking

The history of our concern with the health of the people has been marked not so much by a systematic approach to the over-all problem as it has been characterized by episodes of sudden interest and concern with regard to specific problems which for some reason or other capture the imagination of the professions, the health authorities, or the general public. Thus, the genesis of health administration in Canada, in the form of the early Boards of Health, is an attempt to deal with particular outbreaks of epidemic diseases brought to Canada's Atlantic ports in the 18th and 19th centuries. In recent years the thalidomide affair and the anti-smoking campaign are examples of certain issues assuming the limelight not so much because of an assessment of the particular problem in the perspective of the total health picture but because of a sudden awareness, perhaps also emotionally charged, of specific factors which may not have been fully recognized before. Deformed babies were born before and after thalidomide could be incriminated, yet concerted and well organized efforts to provide babies with the best possible services were initiated only for the thalidomide group. The establishment of a definite relationship between cigarette smoking and lung cancer led to an intensive educational campaign designed to discourage smoking, without similar action taken, for instance, in the field of alcoholism where it may be at least equally important

¹ Alcohol Studies Guide, op. cit., p. 15.

because of the greater impact the alcoholic has on life, health, and general well-being of those around him. Trying to see these problems in their proper perspective does not mean, of course, that because there are other deformed babies no action should have been taken in regard to the thalidomide victims; nor should it be said that because educational campaigns are needed in other fields, nothing should be done about cigarette smoking. On the contrary, the resources brought to bear on thalidomide cases will eventually benefit all similarly affected children. The emphasis on cigarette smoking as a possible cause of lung cancer has highlighted other health hazards of smoking and, on the other hand, stimulated interest in other suspected causes of lung cancer such as air pollution. From the anti-smoking campaign, lessons may be learned for similar action in other fields and other possible causes of lung cancer may also be more thoroughly investigated. An editorial in the *Canadian Journal of Public Health* strongly urges that public health workers curb their smoking habits and refers to broader implications of smoking:

“The relationship that has been established between cigarette smoking and lung cancer has done a great deal to focus attention on the matter of smoking and health. Yet it has also tended to overshadow other relationships. . .”¹

and the editorial proceeds to mention Buerger’s disease, coronary heart disease and other cardiovascular conditions, chronic bronchitis, digestive symptoms, and the relationship between maternal cigarette smoking and its effects on the newborn.

Because of the sharp increase of lung cancer in recent years and because of its linkage with cigarette smoking, a good deal of information has been accumulated on smoking as a health hazard and more recently also on the pattern of smoking habits. Evidence of the association between smoking and lung cancer has been forthcoming from many sources and this also has brought into focus the association between smoking and other diseases, particularly coronary heart disease and bronchitis.² The United States report on smoking and health notes the association among male cigarette smokers between smoking and higher death rates from coronary artery disease but adds that “it is not clear that the association has causal significance”³ The same report finds an association between cigarette smoking and peptic ulcer (greater for gastric than duodenal ulcer), but without being able pending further studies to explain the biological meaning of this association.⁴ It mentions that women who smoke during pregnancy tend to have babies of lower weight,⁵ and refers to the association between smoking and accidental deaths from fires in the home.⁶

¹ “Smoking and Health — The Association and You”, editorial, *Canadian Journal of Public Health* January 1965, p. 34.

² Department of National Health and Welfare, *Smoking and Health*, prepared for the Canadian Conference on Smoking and Health, Ottawa, 1963.

³ U.S. Department of Health, Education, and Welfare, *Smoking and Health*, Public Health Service Publication No. 1103, Washington: U.S. Government Printing Office, p. 327.

⁴ *Ibid.*, p. 340.

⁵ *Ibid.*, p. 343.

⁶ *Ibid.*, p. 345.

On the other side, there is what Dr. Johnson once described as the “thing which requires so little exertion, and yet preserves the mind from total vacuity”. The United States report refers to this as “significant beneficial effects of smoking primarily in the area of mental health” by a measure of contentment derived from the habit, but finds no basis for quantifying such advantage and weighing it against the hazards.¹ A distinction is made between the “habituation” of the smoker and narcotic addiction, the former lacking the serious personality defects underlying the latter.² It should be noted that the United States report clearly distinguishes between the causal relationship it established between cigarette smoking and lung cancer³ and the association noted in other cases. The risks due to or associated with smoking are related to the amount smoked and fall after stopping smoking.⁴ Since Jacques Nicot, the French ambassador to Portugal, introduced tobacco into France in 1560, various short-lived attempts at prohibition have been made partly because smoking was considered bad manners⁵ but as early as under James I also because autopsies revealed that the inward parts of heavy smokers were “soiled and infected with an oily kind of soot”.⁶

Canadians have been spending increasing amounts on tobacco products and accessories. Consumer expenditure on tobacco products and smokers’ accessories has risen by two-thirds from \$455 million in 1952 to \$744 million in 1961.⁷ This increase, however, is due partly to price increases and increased population. The changes in the actual per capita consumption of tobacco products are shown below

Over the last decade, Canadians have been buying more cigars (200 million in 1952 and 352 million in 1962), more cigarettes (18,000 million in 1952 and 39,000 million in 1962), but less tobacco by the pound (34 million lbs. in 1952 and 24 million lbs. in 1962). The per capita consumption also has shown a general upward trend for cigars and especially cigarettes with a decline for tobacco:⁸

| Consumption Per Capita of Population 15 Years and Over | | | |
|--|--------|------------|---------|
| Year | Cigars | Cigarettes | Tobacco |
| | No. | No. | Lbs. |
| 1952 | 20 | 1,784 | 3.4 |
| 1953 | 23 | 2,056 | 2.8 |
| 1954 | 23 | 2,116 | 2.6 |
| 1955 | 24 | 2,306 | 2.4 |

¹ Ibid., p. 356.

² Ibid., p. 351.

³ Ibid., p. 37.

⁴ “Deaths from Smoking”, editorial, British Medical Journal, June 6, 1964, p. 1451.

⁵ “It is a shocking thing blowing smoak out our mouths into other people’s mouths”, as Dr. Johnson puts it in *The Journal of a Tour of the Hebrides*, as quoted in Fletcher, C.M., et al., *Common Sense About Smoking*, Harmondsworth: Penguin Books Ltd., 1963, pp. 83, 84.

⁶ Fletcher, C.M., op. cit., p. 81.

⁷ Dominion Bureau of Statistics, *National Accounts 1926-1956*, Ottawa: Queen’s Printer, 1958, p. 89; and *National Accounts 1963*, Ottawa: Queen’s Printer, 1964, p. 54.

⁸ Based on Dominion Bureau of Statistics, *Canada Year Book 1963-1964*, Ottawa: Queen’s Printer, 1964, p. 872, and data supplied by the Bureau.

Consumption Per Capita of Population 15 Years and Over

| Year | Cigars | Cigarettes | Tobacco |
|------------|--------|------------|---------|
| | No. | No. | Lbs. |
| 1956 | 24 | 2,487 | 2.1 |
| 1957 | 26 | 2,703 | 2.0 |
| 1958 | 28 | 2,844 | 2.0 |
| 1959 | 27 | 2,909 | 2.0 |
| 1960 | 28 | 2,896 | 2.0 |
| 1961 | 28 | 3,046 | 2.0 |
| 1962 | 29 | 3,154 | 2.0 |

The corresponding figure for cigarettes for 1963 is 3,191 cigarettes per capita, and for 1964 a slight decrease to 3,184. Whether this is a chance fluctuation or the beginning of a levelling off remains to be seen, particularly since the year 1960 also brought a slight drop, only to give way to a new high in the following year.

As in the case of statistics on alcohol or any other item of consumption, these averages give a very general idea only of actual consumption patterns, and the effects on the economy. Effects on the health of the people can be interpreted only in terms of changes in the proportion of abstainers, light and heavy smokers. Unfortunately, we know as yet little about such changes since the first and so far only comprehensive survey of smoking habits was undertaken by the Dominion Bureau of Statistics only in 1964. Following are some of the findings of this survey:¹

Non-smokers –

About half of the Canadians 15 years of age and over (about 1/3 of the males and 2/3 of the females) do not smoke at all;

non-smoking is most frequent among those in the age groups 15-19 and 65 and over.

Regular smokers of more than 25 cigarettes a day –

More common among males than females at all ages; more common in larger urban than small urban and rural areas;

least common of all age groups among those in the age group 15-19.

From the beginning, the campaign to reduce the health hazards from smoking has emphasized the need for education and, in particular, education directed at the youngest age groups when the smoking habit is frequently acquired.

Surveys among school children indicate that they start smoking at an early age. According to a Saskatchewan survey, one-third of the high school students smoked their first cigarette before the age of 10.² A Winnipeg study also noted that some children began to smoke “very early”, with the greatest increase in the 11- to 16- year group.³ The smoking habits of Winnipeg students were surveyed

¹ Department of National Health and Welfare, *Smoking Habits of Canadians*, Ottawa, 1965.

² Bailey, A.J., as quoted in Department of National Health and Welfare, *op. cit.*, p. 14.

³ Morison, J.B., Medovy, H., as quoted in Department of National Health and Welfare, *op. cit.*, p. 13.

before and after a three-year programme of health education on the hazards of smoking. Among the findings were:

“There were fewer students at all ages who had never smoked a cigarette at the time of the second survey.

“There was a slight decrease in the number of regular smokers in high school. . .

“A direct relationship between parental smoking and that of the student, and an inverse relationship between academic achievement and student smoking were shown in both surveys.”¹

The same survey concludes that the aim of any educational programme is “to prevent or decrease the incidence of this habit among students throughout their adult lives”.² To be successful, any educational programme at school requires the full cooperation of parents, teachers, and community child health workers. Educational programmes directed at adults are equally important.

As in the case of alcoholism, it will be a battle for the minds, particularly of the young, between the statements of health authorities and the blandishments of the industry.

Drug Addiction

The emphasis under this heading will be on the major problem of narcotic addiction, but other types, such as addiction to barbiturates, have been causing increasing concern. Richman refers to the suggestion that persons formerly addicted to narcotics are now utilizing barbiturates and other preparations. The increasing number of deaths from barbiturates has been cited in support of this contention. Based on a recent study, however, Richman concludes that “charging mortality from barbiturates is not a valid measure of the extent to which general consumption of barbiturates is increasing”.³ Narcotic addiction has been described as a “psychological problem, not a disease but a symptom of underlying personality disorder and an expression of the relationship between this underlying personality disorder and the presence of the individual in a susceptible social situation”.⁴ While alcoholism is found at all social levels of the population, narcotic addiction “tends to occur predominantly in delinquent groups or in that part of the population at lower educational and socio-economic levels”.⁵

Both alcoholism and drug addiction are examples of the areas where the attitude of society has been shifting from considering them primarily as delinquent

¹ Morison, J.B., et al., “Health Education and Cigarette Smoking”, Canadian Medical Association Journal, July 11, 1964, p. 49.

² Ibid., p. 55.

³ Richman, A., Orlaw, R., Barbiturate Mortality as an Index of Barbiturate Use, Canada, 1950-1963, unpublished paper.

⁴ Tyhurst, J.S., et al., More for the Mind, Toronto: The Canadian Mental Health Association 1963, p. 110.

⁵ Ibid.

behaviour to accepting them as health problems, and the addicts as patients rather than criminals. There are basic differences, however, not only in the nature of the addiction but also in the way society seeks to protect itself and the addict from the consequences of these habits. The consequences of both alcoholism and drug addiction differ basically from those of smoking: while smoking is recognized as a major health hazard, it does not result in asocial behaviour, except in an indirect way.

Because the alcoholic and the drug addict not only imperil their own health but in their respective ways also endanger or implicate others, therefore intensive educational campaigns as that against cigarette smoking would appear to be indicated.

The two types of addiction are different from each other and from smoking in their somatic and psychiatric consequences. They also differ in the basic patterns of use and in the social and legal circumstances surrounding this use. The sale of alcoholic beverages and tobacco products to those in the younger age group is prohibited. Adults, however, can legally buy, possess, and use alcohol; they come in conflict with the law only as a consequence of excessive use. In the case of drugs, it is the trafficking as well as the possession which are against the law, whereas there is no legal restriction to smoking, except in the case of juveniles. Provincial legislation similar to that restraining the legal powers of habitual alcoholics, and penalties for impaired driving, applies also to narcotic addicts.

The number of known narcotic addicts in Canada has remained relatively constant over the last ten years:¹

| <u>Year</u> | <u>Number of Known Narcotic Addicts</u> |
|-------------|---|
| 1955 | 3,425 |
| 1956..... | 3,241 |
| 1957 | 3,315 |
| 1958 .. | 3,412 |
| 1959 | 3,408 |
| 1960 | 3,295 |
| 1961 | 3,395 |
| 1962..... | 3,576 |
| 1963 | 3,355 |
| 1964 | 3,352 |

In view of the increasing population, this constitutes a decline in the prevalence rate from about 22 per 100,000 population in 1955 to 17 in 1964.

The Division of Narcotic Control of the Department of National Health and Welfare distinguishes three categories of addicts: 1) the criminal addicts, i.e.,

¹ Data supplied by the Department of National Health and Welfare.

those who have been convicted under the Narcotic Control Act and/or have “ a criminal background” or “criminal associations”; 2) the medical addicts, i.e., those who have some medical condition upon which addiction has become superimposed, or who have become addicted through medical treatment; 3) the professional addicts, i.e., members of the medical or related professions such as pharmacy or nursing who have more or less ready access to narcotic drugs.¹

In 1964, the known narcotic addicts in Canada were distributed as follows among the three categories mentioned:²

| | |
|----------------------|-------|
| Criminal addicts | 2,947 |
| Medical addicts | 237 |
| Professional addicts | 123 |
| Total | 3,352 |

In the same year, over half (51 per cent) of the total known addicts in Canada were in British Columbia.

The following tabulations show the distribution of the 2,947 criminal addicts by various personal characteristics:³

| Age | Per Cent | Sex | Per Cent | Occupation | Per Cent |
|-------------|----------|--------|----------|----------------------------|----------|
| Under 20 | 1.0 | Male | 68.2 | Labourers (unskilled) | 20.9 |
| 20-24 | 11.7 | Female | 31.8 | Service occupations | 11.6 |
| 25-29 | 18.4 | Total | 100.0 | Skilled workers | 9.4 |
| 30-34 | 17.3 | | | Natural resources workers | |
| 35-39 | 14.9 | | | (loggers, woodsmen, etc.) | 6.7 |
| 40-49 | 15.9 | | | Clerical and sales workers | 6.0 |
| 50-59 | 8.8 | | | Prostitutes | 5.9 |
| 60-69 | 2.9 | | | Housewives | 5.5 |
| 70 and over | 0.6 | | | Transportation workers | 3.8 |
| Unknown | 8.5 | | | Entertainment | 2.7 |
| Total | 100.0 | | | Seamen | 1.5 |
| | | | | Managerial, business | 0.8 |
| | | | | Professional (non-medical) | 0.4 |
| | | | | Unclassified occupations | 3.4 |
| | | | | Unknown | 21.4 |
| | | | | Total | 100.0 |

Thus, over one-third of the known criminal addicts are in the age group 25-34 (this being the current age and not the age when first addicted or convicted), over two-thirds are male, and the leading occupational group is that of the unskilled labourers. Heroin is the drug most frequently involved.

¹ Bronetteo, J., Moreau, J.A.E., Statistics of Alcohol Use, Alcoholism and Drug Addiction, Canada and Provinces 1963, reprinted from Annual Report (1964) of the Alcoholism and Drug Addiction Research Foundation, Appendix III, Toronto 1965, p. 12.

² Data supplied by the Department of National Health and Welfare.

³ Ibid.

In a recent paper Richman describes the follow-up of a representative 50 per cent sample of criminal addicts in British Columbia who were studied during a twelve-month period in 1954-55.¹ Among his findings are:

1. the natural history of addiction includes the prospect of "recovery" for about one-fifth of criminal addicts within a five-year period,
2. the prospect for abstinence increases with age of the addict,
3. abstinence is not less likely in addicts who have long histories of police contact, or who have had numerous previous attempts to quit drugs voluntarily.²

The author observes that the onset of criminal addiction is more marked in the younger age groups than in the older, and he questions the belief that narcotic addiction is immutable.³ He quotes Winick⁴ as suggesting the concept of maturing out of narcotic addiction:

"Persons who since adolescence have been violating the law or behaving in an anti-social manner, somewhere between their late twenties and mid-thirties, increasingly seem to be able to modify their behaviour patterns and to adapt to the large society. This process is not automatic, and it does not happen to all members of these groups, but it does happen to a significant proportion."

The problem of further improving the situation in Canada with regard to drug addiction is one of effectively combining the penal and health aspects, and of the breaking of the vicious circle between the profit motive of the narcotic trafficker and the needs of the addict. The fact that there is some promise for the cure and rehabilitation of the addict should not be allowed to obscure the need for strengthening preventive measures against the various forms of addiction:

"It goes without saying that programs designed to correct some of the social and economic ills associated with various forms of addiction are important preventive approaches and much further work needs to be done in these areas. It is recognized that such ills are doubtless more important in and of themselves than is the problem of narcotic addiction with which they are associated."⁵

Voluntary organizations in the field of alcoholism and drug addiction have already accomplished much in the areas of prevention, treatment, and rehabilitation as well as in the field of research. The Royal Commission on Health Services was "greatly impressed by the work of voluntary organizations".⁶ It recommends, among other things, that the substantial revenues from taxes on alcoholic beverages be used, to a greater extent than is now the case, to encourage research and the evaluation of services.⁷

¹ Richman, A., *Follow-up of Criminal Narcotic Addicts*, Vancouver: mimeographed, 1965.

² *Ibid.*, p. 14.

³ *Ibid.*, pp. 2 and 11.

⁴ Winick, C., "The Life Cycle of the Narcotic Addict and of Addiction", *Bulletin on Narcotics*, 1964, pp. 1-11.

⁵ Cameron, D.C., "Addiction — Current Issues", *The American Journal of Psychiatry*, October 1963, p. 318.

⁶ Royal Commission on Health Services, Vol. I, Ottawa: Queen's Printer, 1964, p. 26.

⁷ *Ibid.*, p. 27.

The revenues derived from the sale of alcoholic beverages and tobacco products are very substantial indeed. The brewing industry claims that its taxes alone since 1945 would have been sufficient to pay for the cost of the St. Lawrence Seaway and Power Development as well as the Trans-Canada Highway.¹ For the fiscal year 1963-64 the revenues are estimated to amount to over \$1,000 million, shared between the federal and provincial governments roughly as follows:²

| | <u>Federal</u> | <u>Provincial</u> | <u>Total</u> |
|--------------|----------------|-------------------|--------------|
| | (\$'000,000) | (\$'000,000) | (\$'000,000) |
| Alcohol..... | 250 | 313 | 563 |
| Tobacco..... | 407 | 93 | 500 |
| Total..... | 657 | 406 | 1,063 |

The total amounts to about one-tenth of all tax revenues in Canada, and the percentage is a good deal higher if viewed at the provincial level only. Two questions arise from this high tax yield. First, what is the philosophy behind the collection of taxes on goods that should not be bought by Canadians, or at least not to the extent that they are being consumed? Fiscal policies and the reasons behind them vary, of course, but it would appear that the high tax yield is not so much a matter of governments taking advantage of these “vices” but rather of vain attempts to discourage the use of alcohol and tobacco by increasing the cost to the consumer. The next question is: where would comparable government revenues come from if health education proved completely successful and people stopped buying alcoholic beverages or tobacco products, and what would happen to the respective industries? The public health worker may not be able to provide a satisfactory answer to these questions but he should be aware of these and other social or economic results of his actions. There certainly can be no question of condoning alcoholism or smoking just because the treasuries need the tax revenue. This has been accepted policy all along in the case of habit-forming drugs. It would be difficult, however, to estimate the tax revenue from only the excessive use of alcohol which governments would stand to lose nor can the result of smokers either “kicking the habit” or shifting from cigarettes to other types of smoking be anticipated. There is, of course, a possibility of some loss of tax revenue resulting from a better educated public but there are also economic advantages - in addition to the social and health benefits - to be expected from a reduction in alcoholism and smoking. Among them are a longer working life expectancy; reduced disability;³ higher productivity; fewer accidents to themselves and others as well as reduced property damage;⁴ reduced cost of treatment services, institutional care, and welfare services to the addicts and their dependents.

¹ Brewers Association of Canada, *Brewing in Canada*, Ottawa, 1965, p. 81.

² Based on Department of National Revenue, *Annual Report for the fiscal year ended March 31, 1964*, Ottawa: Queen's Printer, 1965; Canadian Tax Foundation, *Provincial Finances 1965*, Toronto, 1965; and estimated revenue from sales taxes.

³ “Alcoholic employees in industry are about 6% of all industrial employees and have average annual absenteeism records that are from 10 to 20 days in excess of the normal” (Canadian Council on Alcoholism, brief submitted to the Royal Commission on Health Services, Toronto, 1962, p. 1.)

⁴ Including reduced damage from fires caused by careless smokers.

AND GOD SAW THAT IT WAS GOOD

Water, earth, and the firmament having been made with every plant and living creature, they were ready for a Garden of Eden. But outside the Garden nature does not evenly distribute her favours or disfavours. This applies to the geographic factors as well as to matters like the mineral contents of the water supply. Man has succeeded in compensating for some of these differences in his housing, clothing, agriculture, and, for instance, in the fluoridation of water where nature fails to provide it. But besides protecting himself against natural hazards and helping nature along, man's ways began to have incidental but often profound effects on his environment. Living together in communities of growing size created many new health problems and the very progress in the scientific and technical sphere has had its undesirable effects on the air, the water, and the soil around us. Even before he lost his paradise, Milton has Adam admonished:

"Accuse not Nature, she hath done her part;
Do thou but thine!"

Expressed in the language of modern ecology, the admonition is that the illnesses engendered by the increasingly man-made physical environment and the social and cultural patterns "can be encompassed sufficiently within medical awareness and influenced only by the intelligent organization of counter trends and by the utmost administrative use of the disease-detection and disease-treating which comes to it".¹

Preventive medicine has always been concerned with protecting man from environmental hazards. Many of the hazards and their antidotes have been quite specific: certain vaccines were found to protect against certain diseases. Widening scientific knowledge, however, and the increasing complexity of man-made changes in his natural environment have led to the recognition of much more diffuse and subtle cause and effect relationships. On the one hand, specific symptoms or diseases may be caused by intricate constellations of circumstances which may be difficult to disentangle. The causative agent of an allergy can be very elusive; lung cancer may be due to smoking habits but also to air pollution which in itself is only the sum-total of many substances causing it. On the other hand, a specific phenomenon like radiation may have many and varied effects, some ill but some perhaps good, many yet insufficiently known and explored. Air and water pollution, food additives, smoking, or alcoholism also are not confined in their effect to specific parts or systems of the human body or mind. All of which illustrates the immensely complex task faced by preventive medicine today.

The very fact that many of the environmental factors are man-made eases the task. It is, in fact, fortunate for man "because this places the changes within his

¹ Stainbrook, E., "Man and His Changing Environment - Health and Disease and the Changing Social and Cultural Environment of Man", *American Journal of Public Health*, July, 1961, p. 1008.

control if he gains the necessary knowledge and exercises the necessary wisdom".¹ Gaining the necessary knowledge, however, and exercising the necessary wisdom poses a new challenge to traditional preventive medicine and epidemiology, and to the newer emphasis on human ecology and social medicine as well as to the basic sciences involved in the study of the biological and genetic effects of these new, or newly recognized, influences.

Because of the interplay of so many factors and because of the time lag -- in some cases perhaps generations -- between control measures and any proof of their success, the etiology of many of our modern environmental health problems may be less dramatic than some of the discoveries of the past, but in the long run the effects of control measures may well be ranked with those of the modern drugs. Among the problem areas are those of air and water pollution, radiation, pesticides and fertilizers, nutrition as well as food hygiene and additives, physical and mental stress, veterinary medicine, and other matters related to man's natural or social environment.

The ever-widening knowledge of environmental factors affecting man's health, the new hazards created by technological and social changes, and, on the other hand, the improved methods of controlling hazards and ability of the economy to implement such measures, open a new broad field for preventive medicine, traditional public health, and sanitation. The new disciplines in the areas of the physical and social sciences thus drawn into the health field have brought about shifts in the respective tasks and responsibilities of preventive medicine, public health, sanitation, as well as the diagnostic and curative health services so that the borderlines have frequently been changed and, perhaps more often, blurred. Public utilities have taken on public health responsibilities once these have been stabilized into engineering and administrative problems. The physician, especially the newly emerging type of general practitioner, and the psychiatrist, who in their practice employ the concept of social medicine, are performing tasks developed by public health, and preventive medicine, as well as the social sciences whose support they will need.

Man's relationship to his natural environment may be characterized by two developments. One is the replacement of physical adaptation of the body and mind by the products of technological progress, thus enlarging "the space of biological equilibrium between his organism and his environment".² The other development is the impact of man's presence and activities on his natural environment. To establish whether or not this impact is necessarily bad or as bad as often described may require further and protracted study. There is no doubt, however, that many of the man-made changes in the environment are potentially hazardous thus providing "a challenge to both curative and preventive medicine - a challenge

¹ Auld, D.V., "Problems of the Physical Environment", Public Health Reports, July 1961, p. 633.

² "Environmental Health -- Once Again", editorial, American Journal of Public Health, November 1961, p. 1836.

that requires additional types of medical knowledge, new skills and new settings for application of such knowledge and skills".¹

Climate and Atmosphere

Man is a creature of his natural environment but his evolution is due largely to his ability to overcome or fashion to his advantage certain basically limiting or inimical forces in nature. His ability to devise tools enabled him gradually to erect shelters and generally to protect himself against the hazards of climate, wild animals and eventually other obstacles which previously prevented him from entering any part of the surface of the globe, the atmosphere and, of late, also outer space and the depths of the ocean. Every encounter with new hazards also means new problems for the protection of his health.

The technical problems of health in such extreme environments as outer space, below the ocean surface, the polar regions, or matters of aviation medicine and specific occupational environments are the subject of intensive research, but it should be remembered that Canadians in their every day life are exposed to great variations and extremes of climate. Here are some examples to illustrate this variety of climatic conditions in Canada:²

The mean temperature in January ranges from minus 36 degrees Fahrenheit at Eureka in the Arctic Archipelago to 40 degrees at Estevan Point at the west coast of Vancouver Island.

In July, the mean temperatures are from a low of 38 degrees at Mould Bay in the Arctic to 73 degrees in Windsor.

The extreme temperatures on record range from a low of minus 81 at Snag in the Yukon to a high of 110 degrees in Regina.

Winter³ may begin as early as August 6 at Fort Good Hope in the Mackenzie District, or as late as December 7 in Victoria. And it may end as early as February 28 in Victoria, or as late as July 5 at Port Harrison in northern Quebec. But in addition, of course, the short winter in Victoria is also much milder than the long winter night in the Arctic.

Total precipitation ranges from 3 inches at Eureka to 108 inches at Estevan Point; snowfall from 10 inches at Estevan Point to 343 inches at Glacier in British Columbia.

Man, as we have seen, has managed to compensate for such extremes of climate and weather. In spite of his clothing and heated or air-conditioned housing, however, he remains exposed to some extent to the weather, whose effects on health have been studied extensively, particularly under such extreme conditions as we find them in the Arctic. Medical science has accumulated a considerable

¹ Kehoe, R.A., as quoted in Rogers, F.B., "Man and His Changing Environment — Historical Perspective", *American Journal of Public Health*, November 1961, p. 1641.

² Based on Dominion Bureau of Statistics, *Canada Year Book 1963-1964*, Ottawa: Queen's Printer, 1964.

³ From the average date of first freeze in autumn to that of the last freeze in spring.

store of information regarding the effect on humans of such specific factors as heat or cold.

But temperature, moisture, cloudiness, air and water currents, and topography all combine into what we refer to as weather and climate. How then, if at all, does Canada's climate affect the health of the people? The first obstacle to a simple answer to this question is the fact that Canada, vast and varied as it is, has many different climatic regions and a great variety of weather conditions. Then, Canadians as we have seen are a very mobile people; any observation of climatic effects would, therefore, have to distinguish between long-term and short-term effects. Clothing, insulated buildings, centrally heated and air-conditioned homes, factories, offices and means of transportation compensate largely for extremes of climate and weather. If we detect regional differences in health conditions coinciding with climatic regions, we would have to determine whether this is actually a cause-and-effect relationship or merely an association caused perhaps by socio-economic factors rather than the climate. If, for instance, there is a high incidence of tuberculosis and infant mortality in the North, they are due to living conditions which could be ameliorated to cope even with a very harsh climate.

Regional differences in health and longevity have been observed since the very early days of epidemiological study. In 1884, Hingston observed that "if we compare the northern division with the more southerly divisions in the United States, the comparison is most favorable to the former, and by ricochet to Canada".¹ And he states that "the intimate connexion between the ratio of mortality and the physical geography of a country is recognized generally".² He cites the example of the Registrar General's report which explains certain phenomena connected with seasonal variations of the death rate with the extremely irregular figure of Scotland whose mainland is "so broken up by promontories and indented by bays and firths, that even at its most solid part there are few points which are more than 40 miles distant from the sea".³ While Hingston assigns great importance to the influence of the climate, he also cautions that there are "other agencies, beside the atmosphere, which influence us; and chief among them are the habits of the people".⁴ Generally speaking, however, Canadians are assumed to owe their favorable health condition to the natural setting provided for them by providence:

"Indeed, considering the few diseases which here afflict humanity relatively to elsewhere, we have great reason to be thankful to the All-powerfull Controller of the seasons as of our fate, that in separating us from the great branch of the European family; and in placing us where there are indeed no majestic ruins scattered around to prove past greatness or add to present interest. . . He has prepared for us a land where we may not only live in peace with all men, but in the assurance that He keeps us in health, comfort and safety."⁵

¹ Hingston, W.M., *The Climate of Canada and its Relation to Life and Health*, Montreal: Dawson Brothers, 1884, p. 111.

² Ibid.

³ Ibid., p. XVIII.

⁴ Ibid., p. 157.

⁵ Ibid., pp. 126-127.

Toynbee claims, not always too convincingly; that history demonstrates the development of the various civilizations to be largely the result of the stimulus derived from the natural environment: "civilizations come to birth in environments that are unusually difficult and not unusually easy".¹ This stimulus results in the vigour necessary for man to develop from his primitive state; it is related to but not necessarily synonymous with good health. This concept is similar to that of climatic stimulation or energy which social and medical geographers² have carried to its logical conclusion by preparing maps which chart the areas with varying degrees of such climatic stimulation. They locate the regions of greatest stimulation in the temperate zone, in North America in a belt roughly along the Canada -- United States border from the Atlantic coast to the western mountain ranges and then, in the general area of Alberta, swinging farther north.³ That means, it follows very roughly the January isothermal lines of 20°F to 30°F in January, and about 60°F to 70°F in July. Huntington seems to follow the isothermal lines rather, while Mills' chart appears to coincide more also with hyetal conditions, combining temperature and dryness.

The theory of the stimulating effect of a temperate climate with seasonal changes and fluctuations between day and night seems more plausible than Toynbee's explanation of the New Englanders' accomplishments because theirs has been "the hardest country of all", comparing it to what Canadians to the north had to encounter and the people in Louisiana, for instance, to the south.⁴ When Toynbee speaks of the hardness of the country, he takes it "all in all -- soil, climate, transport facilities and the rest".⁵

Markham, following earlier climatologists, identifies "humidity, air movement and radiation"⁶ as the factors having their effect upon our bodies and energies and he harbours "not the slightest doubt that the ideal combination of these factors goes a long way towards enabling men to be healthier and more energetic".⁷ Having established the ideal temperature as between 60°F and 76°F, and the ideal humidity range as between 40 and 70 per cent, Markham applies this to the climatic conditions in many countries as well as within the United States; his statistics imply that as, moving south, the temperature goes up, the energy goes down.

He locates the most stimulating zone in North America between the 10°F winter isotherm, and the 75°F summer isotherm, which is roughly the same area

¹ Toynbee, A.J., *A Study of History*, London: Oxford University Press, 1947, p. 140.

² For instance, Huntington, E., et al., *Economic and Social Geography*, New York: Wiley and Chapman, 1933; Huntington, E., *Civilization and Climate*, Newhaven: Yale University Press, 1933; Mills, C.A., *Medical Climatology*, Springfield, Ill.: Thomas, 1939.

³ Huntington, E., *Civilization and Climate*, op. cit., p. 234; and Mills, C.A., op. cit., p. 71; re Canada's Climatic Regions see Dominion Bureau of Statistics, *Canada Year Book 1959*; Ottawa: Queen's Printer, 1959, pp. 26, 27.

⁴ Toynbee, A.J., op. cit., p. 99.

⁵ Ibid.

⁶ Markham, S.F., *Climate and the Energy of Nations*, London: Oxford University Press, 1947, p. 21.

⁷ Ibid.

as delineated by Huntington and Mills. Markham proceeds from there to locating the region of what he considers as high civilization (combining indices of intelligence, income, and infant mortality); this region too coincides largely with that determined by climatic stimulation. This is also part of the somewhat wider but similarly oriented zone in North America of a moderately wide variation (30°F to 55°F range) in temperature between the coolest and the warmest months.¹

Storminess also is referred by some as a stimulating factor.² Yet, it is the subtropical and the tropical regions where early civilizations and cultures have developed. Marshall, an economist, explains it thus: "Nature has marked out a few places on earth's surface as specially favourable to man's first attempts to raise himself from the savage state; and the first growth of culture and the industrial arts was directed and controlled by the physical conditions of these favourite spots". Then, however, the decline followed because "the climate which has rendered an early civilization possible has also doomed it to weakness. In colder climates nature provides an invigorating atmosphere".³ There can be little doubt that, at least before the advent of air-conditioning, modern industrial establishments could hardly have developed in the hot climates but the location of major resources of ore, coal and other raw materials also may have played a role in shifting the location of human advance to the temperate zone.

In this discussion we have been concerned mainly with stimulation, energy, vigour and similar phenomena not necessarily identical with merely the absence of physical disease; freedom from illness is sought and found by many on the beaches of Florida or California rather than in Canadian climates. But this is an illustration of positive health meaning the extra vigour and vitality rather than just the absence of illness.

Besides the effects of the geographic factors, such as climate, on the general health, vigour, energy, and way of life, there are certain topographic factors related to specific aspects of health and disease. Examples are the presence or absence of iodine in the soil or fluoride in the water with the resulting effects on the prevalence of goiter or tooth defects. Then there are the indirect consequences that climatic conditions have on human health: Canada, for instance, is free from many of the infectious diseases characteristic of warmer climates because its climate is unsuitable for the disease vector. Colds, pneumonia, bronchitis, rheumatic diseases may be directly affected by climatic conditions. But in many cases it is very difficult to separate the effects of the natural from those of the social environment. The relationship is not a simple one. Differences between the northern and southern United States, for instance, may be ascribed to climate or social conditions, whereby the latter may again be partly the result of the former. Certain types of morbidity and mortality are due not to temperature, precipitation, or wind but to disease vectors thriving in this environment.

¹ Encyclopaedia Britannica World Atlas, New York: C.S. Hammond & Co., 1949, plate 17.

² For instance, Mills, C.A., *op. cit.*, and Peterson, W.F., *The Patient and the Weather*, Ann Arbor: Edwards Bros., 1937.

³ Marshall, A., *Principles of Economics*, Appendix A, 1, London: MacMillan, 1936, p. 724.

Mortality and morbidity show definite seasonal trends, and the recent report of an expert committee to the World Meteorological Organization¹ enumerates a great variety of conditions whose incidence or severity are influenced by the weather.² The report deals particularly with short-term changes in the weather such as periods of increased atmospheric activity as occur during thunderstorms: traffic and work accidents increase, as do acute respiratory disease, while many chronic conditions are aggravated. Human reactions are 6 per cent slower during such periods. It is this latter effect which is thought to contribute to the higher accident rate. It is not so much the clearly noticeable and immediately felt weather conditions such as fog or slippery roads, but weather stimuli acting on the body often without perceptible symptom.³

What remains of climatic effects on his health is gradually being reduced by man. The control of disease vectors in tropical and subtropical climates, air-conditioning against heat, and well insulated and heated living and working quarters in the North are increasingly equalizing living conditions in various parts of the world and in this country. For most Canadians who go to work in the North -- if not for most of the indigenous people -- living accommodation is very much like what they have been used to in the South. Far greater progress has been made in this respect in the arctic zones of other countries. The Greenlanders are housed in a manner which well protects them from the hostile climate; the Soviet Union boasts large industrial cities in the latitudes of Canada's barren tundra.

The modern city as such has an effect on the climate and weather within its area: buildings reduce the wind; the temperature is somewhat higher than in the surrounding rural areas; chimneys and engine exhausts combine, particularly in industrial areas, to reduce sunshine and ultra-violet radiation, and possibly increase precipitation.⁴ In the rural areas, deforestation and the type of soil cultivation influence the weather. Beyond these effects incidental to progressing civilization, there are signs that the desire to protect against the hazards of the natural environment will lead to greater and greater isolation from that environment. There are designs of arctic towns of the future where all life would take place under an air-conditioned canopy; windowless schools are being built, relying entirely on artificial light and air control, leading to complete isolation from man's accustomed ecologic environment for at least some important periods in the life of the individual.

It has been demonstrated that man can live, work, and think for prolonged periods in such for him unnatural environments as the depth of the ocean or the space beyond the atmosphere.

What this isolation from climate and weather is going to do to man and his health in the long run is yet unknown and it remains to be seen whether the end

¹ Sargent, F., Tromp, S.W., ed., *A Survey of Human Biometeorology*, Technical Note No. 65, Geneva: World Meteorological Organization, 1964.

² *Ibid.*, pp. 56-61.

³ *Ibid.*

⁴ *Ibid.*, pp. 76-80.

result will be a completely capsuled life or whether these processes of civilization will increasingly call for at least temporary compensation by an occasional return to nature such as we have discussed when speaking of fitness, camping, and the role of nature reserves.

Reference has already been made to the fact that apart from the desire for protection against natural hazards man has interfered with his natural environment in many ways incidental to his technological advances. He has thus affected the air, water, and soil around him, all substances essential to his life and health. Some of these unwitting interferences are outlined below.

The Air We Breathe

Man is not the only creature to act upon his natural surroundings thus adapting and changing them in some way or other. The very processes of breathing, feeding, seeking habitation, and decomposing alter the environment: the calcareous skeleton of the coral at the bottom of the sea, the roots sunk into the ground by plants and the process of assimilating light and air, the food taken by animals from among plants or other animals, the burrows dug by gophers, and the engineering works of the beaver, all influence the environment. Yet, all these processes and activities are limited to immediate needs and compensate for each other thus forming the balance of nature or her unity which is "the way living things work in the interest of other living things, while at the same time going about their own occasions".¹ It is part of the perpetual cycle of life:

"The formation of humus, by which plants provide other plants with organic matter; and the nitrogen-cycle, by which bacteria break down this organic matter so that the resulting nitrates become available to the plants, are two notable and closely linked examples. Photosynthesis and the respiration of plants are two more. Yet another is transpiration. In all these, not plants only but animals take their share and make their contribution. They are fundamental and world-wide. Wherever there is life on land they are in operation ceaselessly and cyclically. Wherever there is life in the sea and in fresh water they operate, with inevitable modifications, also. Because of them the whole earth is a habitat fitted for living things, a habitat of infinite diversity, yet at the same time dovetailed into basic unity."²

But then man somehow began to extricate himself from this basic unity, to move out on a tangent from the perpetual cycle that we call nature, "the forces or powers that animate and regulate" the universe.³ It may have been his faculty to plan ahead instead of just satisfying immediate needs; it may have been his ability to fashion tools; but perhaps more than any other single achievement, it may have been his promethean taming of the fire which so largely emancipated man from the otherwise inescapable cycle and interplay of the forces of nature. He has not been able to cut himself entirely loose from these forces but in many respects his interference with his environment has reached beyond that of other living things to an

¹ Reid, L., *The Sociology of Nature*, Harmondsworth: Penguin Books Ltd., 1962, p. 38.

² Ibid.

³ Webster's Unabridged Encyclopedic Dictionary, New York: Educational Book Guild, Inc., 1957.

extent where it is not and cannot be balanced any more by the function of other forms of life. Hence, where these changes due to man's interference are for the worse, he can no longer rely on the natural forces for their remedy, and in the case of many of the technological advances he has to devise his own means of counter-acting any adverse consequences.

It was the great gift of the fire which first disturbed the balance of nature in the atmosphere once men began to concentrate in towns and cities. The problems of such concentration became noticeable in England as early as the 13th and 14th centuries. Coal smoke had come to be regarded as a menace to health, leading in 1306 to an edict by Edward I, prohibiting the burning of coal. In 1661, a report titled "Fumifugium" claimed that almost half of the deaths in the City of London were due to "phthisical and pulmonic distemper" resulting from air polluted by fumes from sulfur and arsenic.¹ Three hundred years later, during one week in the modern City of London in 1952, 4,000 more people than usual died as a consequence of weather conditions allowing an accumulation of air pollutants combining with a "pea soup" fog.² Industrial development and urbanization have not only aggravated the problems of smoke abatement but also added to the hazards of coal smoke those of combustion engine exhausts, ionizing radiation, and others, and we have already referred to the reduced amount of effective sunshine in our cities due to the many foreign substances introduced into the air. Without effective counter measures, air pollution will increase as urbanization progresses; if the situation is bad today, we are warned that the danger of environmental contamination will increase in the United States, for instance, where by 1970 an estimated 75 per cent of the population "will be jammed into only 10 per cent of the nation's land area".³

As in other instances of public interest being aroused in specific health problems, several acute episodes have drawn public attention to the problem and the danger of air pollution. Among them were the episodes in the Meuse Valley, Belgium, in 1930, where in the short period of a few days, thousands became ill and 60 people died of causes related to the fog and weather inversion;⁴ in Donora, Pennsylvania, in 1948, where within four days of weather inversion and fog 17 deaths occurred instead of the average two; then, in 1952, there occurred the above-mentioned episode in London.⁵

¹ U.S. Federal Security Agency, Environment and Health, Public Health Service Publication No. 84, Washington: U.S. Government Printing Office 1951, p. 31.

² Heimann, H., *Air Pollution and Respiratory Disease*, Public Health Service Publication No. 1257, Washington: U.S. Government Printing Office 1964, p.4.

³ Rogers, F.B., op. cit., p. 1640.

⁴ In a weather inversion, the air at ground level, instead of being warmer than the air above it as it usually is, is actually cooler and, therefore, does not rise in the normal manner to permit other cleaner air to move in. Heimann, H., op. cit. p. 4.

⁵ Heimann, H., op. cit., pp. 4 and 5.

The air contains natural as well as man-made health hazards; among the former are the pollens causing allergies, and there is also a certain amount of natural radiation. The effects of these pollutants on human health are not fully known and explored. As recently as 1961, Wolman warned that we are far from having all the answers:

“Many questions remain unanswered. What standards of air cleanliness are to be maintained and for what reasons? What are the effects of air pollution upon man, plant, and animal life? Are they the results of short or long exposure and are they likely to do major harm to biological life? The intuitive assumptions that a polluted atmosphere is not conducive to the best health still lack either strong statistical or epidemiological support.”¹

But he adds that the increased pace of technological development and growth of cities “have pushed forward more rapidly the necessity for detailed exploration of air pollution than might have been the case in a more leisurely developing technology”.²

Some of these effects, however, have been studied and are well known. Air pollution contributes significantly, as a cause or aggravating factor, to the following conditions: acute respiratory infections, chronic bronchitis, chronic constrictive ventilatory disease, pulmonary emphysems, bronchial asthma, and lung cancer.³ Acute episodes of markedly increased atmospheric pollution, such as the three instances mentioned, show that illnesses and deaths begin to rise within a day after the onset of such episodes. They reach a peak about the time that maximum concentrations of pollution are attained and thereafter drop off, although less rapidly, as the pollution levels decrease.⁴ Particularly vulnerable to such air pollution episodes seem to be the elderly or those who have a history of pre-existing pulmonary or respiratory conditions.⁵ A three-day period of unusually high pollution concentrations in the Detroit-Windsor area in 1952 was accompanied by a “striking rise in infant mortality and in deaths of individuals with malignant disease”.⁶ In the Donora episode of 1948 it was found that persons with a previous history of cardio-respiratory disease showed the highest subsequent mortality.⁷

¹ Wolman, A., “The Changing Physical and Biological Environment of Man”, *American Journal of Public Health*, November 1961, p. 1633. See also “Atmospheric Pollution”, editorial, *Canadian Medical Association Journal*, Feb. 13, 1965, pp. 375, 376.

² Ibid.

³ Heimann, H., *op. cit.*, p. 17.

⁴ Katz, M., “Some Toxic Effects of Air Pollution on Public Health”, *Medical Services Journal*, June 1960, p. 510.

⁵ Ibid., pp. 509, 510.

⁶ Ibid., p. 510.

⁷ Ibid.

Observations in the Detroit-Windsor area show the following differences in the lung cancer death rates among men at selected ages:¹

| Age | Rates per 10,000 | |
|-----|---------------------|--------------------|
| | High Pollution Area | Low Pollution Area |
| 40 | 5 | 3 |
| 50 | 15 | 10 |
| 65 | 42 | 34 |
| 75 | 35 | 18 |

At the age of 75, the rate in the high pollution area was nearly twice that in the low pollution area. Studies in the United States show that, of all causes of death, the following were found to show high correlations with various indices “which might relate” to increasing air pollution: 1) cancer of the trachea, bronchus, and lung; 2) cancer of the stomach and esophagus; 3) arteriosclerotic heart disease, including coronary disease; 4) chronic endocarditis (not specified as rheumatic) and other myocardial degeneration.² In the United Kingdom high correlation between lung cancer mortality and smoke concentration in the atmosphere has been established.³ These correlations, however, require further research to establish whether the association between high air pollution and high mortality rates from diseases, such as lung cancer and other chronic conditions, implies actual causation of these diseases by air pollutants. Referring to the conclusive evidence associating habitual cigarette smoking and lung cancer, Katz observes that differences exist in the incidence of lung cancer which are not entirely accounted for by variations in smoking habits; it would appear evident that airborne carcinogens also “play an important role” in the causation of lung cancer.⁴

Reviewing air pollution in Canada, the same author identifies the following sources:

“Major sources of air contaminants in urban areas are the products of combustion released in ever-increasing quantities through the fuels for domestic and industrial heating, power generation, vehicular, railway, and vessel transportation, and other purposes. In keeping with the strong upward trend in industrial production during the last decade, new air pollution problems have arisen in Canada while existing ones have been intensified by such sources. Apart from the emissions resulting from the combustion of fuels, important sources of contaminants exist in the manufacture of iron and steel, non-ferrous metal smelting and refining, oil refining and petrochemical, general inorganic and organic chemical, pulp and paper, and many other process industries.”⁵

¹ Katz, M., Ball, W.L., “Occupational Health and Air Pollution Research in Canada’s Changing Economy”, American Industrial Hygiene Association Journal, September-October 1963, p. 525.

² Manos, N.E., Fisher, G.F., and Prindle, R.A., as quoted by Katz, M., op. cit., p. 511.

³ Ibid. p. 517.

⁴ Katz, M., “Air Pollution and Lung Cancer”, Medical Services Journal, September 1964, p. 674.

⁵ Katz, M., “Air Pollution in Canada – Current Status Report”, American Journal of Public Health, February 1963, p. 174.

Pollution levels vary considerably in time and place. In general, taking the lower atmosphere over the ocean as unity, the average pollution would be roughly as follows:¹

| | |
|--------------|---------------------------------|
| rural areas | about 10 times greater |
| small towns | about 35 times greater |
| large cities | about 100 or more times greater |

Dust storms, forest fires, and other large atmospheric disturbances may bring pollution into rural and urban areas from distant sources. The rates of dust deposition have been observed to vary considerably within the area of large cities from a high in industrial zones to intermediate in commercial-residential areas and low in suburban districts.²

Among the numerous comparative studies undertaken to assess the effects of air pollution, some carefully coordinated comparisons have been made between the communities of Chilliwack, British Columbia, and Berlin, New Hampshire. The former was taken as a low pollution, the latter as a high pollution area. The study showed that "in general, respiratory symptoms and disease, and physiological abnormalities were more common" in the polluted area of Berlin than in more rural and relatively pollution-free Chilliwack; but attention is drawn to the possible effects of other factors such as smoking habits or ethnic background in the respective populations.³ The survey disclosed that in the two communities certain measures of lung function "have differed significantly in the same fashion as air pollution, even after standardizing for smoking habits, age, height and sex".⁴

In addition to creating health hazards, air pollution causes substantial economic losses to vegetation, buildings, and other property, estimated to amount to over half a billion dollars annually in Canada.⁵

There are instances of very successful reductions of air pollution by industry. A spectacular example is that of the smelter in Trail, British Columbia, whose harmful effects on farm crops and forests across the United States border led to a study of the problem, resulting in an entirely new industry using the previously wasted sulfur oxides emitted into the air.⁶ Many other industries also have successfully controlled the amount of air pollution resulting from their activities. Recent newspaper reports⁷ mention steps by the United States government to encourage the installation of pollution control systems in car exhausts. The various sources of air pollution are the place where control measures must be initiated.

¹ Ibid., p. 177.

² Ibid.

³ Anderson, D.O., et al., "The Chilliwack Respiratory Survey, 1963, Part III", Canadian Medical Association Journal, May 8, 1965, pp. 1007-1016.

⁴ Anderson, D.O., et al., op. cit., Part IV, Canadian Medical Association Journal, May 1965, p. 1075.

⁵ Katz, M., "Air Pollution as a Canadian Regional Problem", background paper for the Resources for Tomorrow Conference, 1961.

⁶ Katz, M., "Air Pollution in Canada - Current Status Report", op. cit., p. 174.

⁷ Of July 1, 1965.

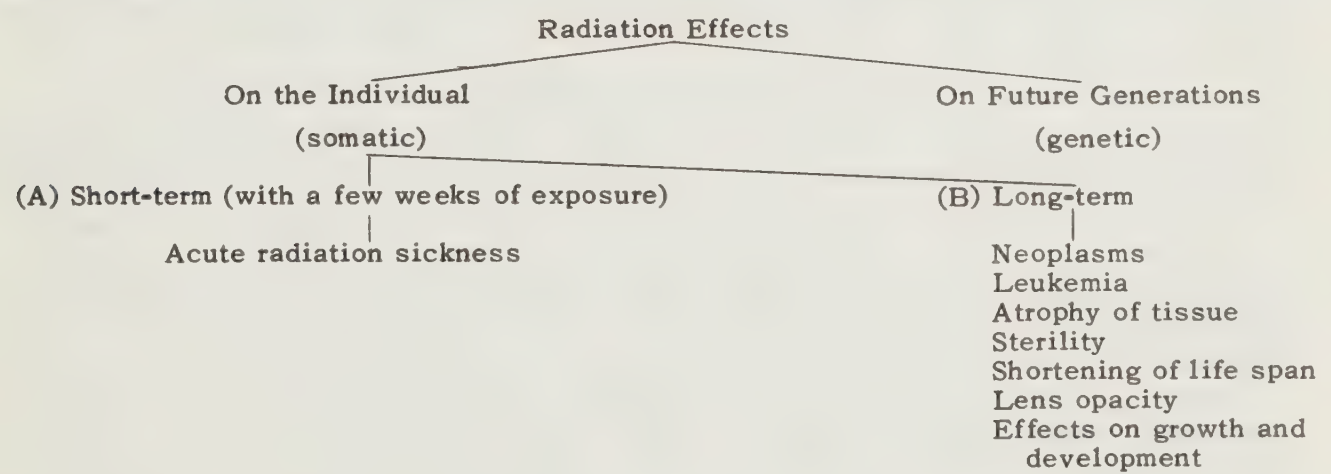
Extensive research is needed to solve the problem of pollution from existing sources as well as from new industrial processes and the use of new materials and substances. Such research is being carried out by an increasing number of research establishments in the federal and provincial governments, by industry, railways, and other organizations. The importance of an adequate understanding of the air-pollution problem may be gathered from the role that air plays in maintaining all living things. For humans it is found that the average adult requires about 15,000 to 20,000 quarts of fresh air daily, or ten times as much by weight as the total amount of food and water consumed daily.¹

Radiation

“Nuclear radiation in all forms and from whatever source (including X-rays and electron-producing sources) is potentially harmful to living organisms, and the presence of such radiation in the environment constitutes a public health problem. Because the health of a population may be impaired by an increase in radiation, public health authorities must be concerned with the possible health effects of such radioactivity and with its control.”²

It will be noted that this statement by the World Health Organization refers to “potential” harmfulness and “possible” health effects. Here, as Wolman commented in regard to air pollution, the fact that some radiation is present does not necessarily mean harmful effects on human health.

Extensive research into the consequences of the atomic explosions during the last war³ and more recent concern with the radioactive fall-out following test explosions have highlighted, as never before, the hazards to human life and health from excessive radiation, even though these dangers became already known a few years after Roentgen’s discovery of X-rays in 1902.⁴ The effects may be classified as follows:⁵



¹ Katz, M., "Some Toxic Effects of Air Pollution on Public Health", op. cit., pp. 504, 505.

² World Health Organization, Post-Graduate Training in the Public Health Aspects of Nuclear Energy, Technical Report Series No. 154, Geneva, 1958, p. 6.

³ See Committee for Compilation of Reports on Research in the Effects of Radioactivity, Research in the Effects and Influences of the Nuclear Bomb Test Explosions, Tokyo: Japan Society for the Promotion of Science, 1956.

⁴ Rogers, F.B., op. cit., p. 1640.

⁵ Based on Williams, N., "Radiation Protection in Canada — Part VII. The Role of Industrial Hygiene in the Field of Radiation Protection", Canadian Medical Association Journal, May 8, 1965, pp. 993, 994.

These are effects which can occur after exposure to large doses of radiation. At low-dose rates, however, the situation is not yet entirely clear but the cumulative effects of even small doses make it imperative that exposure to radiation from any source be kept to the minimum and that any possible exposure be closely watched.

It must be borne in mind that not all radiation is man-made and that the radiation effects of X-rays and fall-out are superimposed upon existing levels of natural radiation. One approach to evaluating the significance of radiation from various sources is contained in a table compiled by the United Nations Scientific Committee on the Effects of Atomic Radiations:¹

| Source | Hereditary | Somatic Effects | |
|--------------------------------|------------|-----------------|-------------|
| | Effects | Leukemia | Bone Tumors |
| Natural radiation sources..... | 1.00 | 1.00 | 1.00 |
| Medical irradiation | 0.30 | 0.4-0.8 | ? |
| Fall-out from tests up to | | | |
| Dec. 1961 | 0.11 | 0.15 | 0.23 |
| Fall-out from continued | | | |
| testing..... | 0.23 | 0.28 | 0.43 |

These are estimated averages for the entire world population but the medical irradiation is calculated largely on the basis of data from countries with advanced medical facilities. The risk from natural radiation is taken as unity so that the figures for the other sources indicate their impact relative to the natural one.

A different picture emerges from Newcombe's comparison of the genetic radiation impact from various sources taken over a 30-year generation time. This results in the following picture which, in the words of the author, "may help to create a sense of proportion":²

| Source of Radiation | Dose to Reproductive Cells in 30-year Generation Time |
|--------------------------------------|--|
| | (average per person) |
| Natural radiation | 3 roentgens |
| Medical uses of X-rays | 3 " |
| Suggested maximum for future | |
| peaceful uses of atomic energy..... | 5 " |
| Fall-out (assuming continued testing | |
| at the 1952-56 rate)..... | 0.1 " |

Thus, each of the man-made sources contribute risks of about the same order of size as natural radiation. But the cumulative effect must be kept in mind so that according to these estimates a total of 8 roentgens per generation from man-made hazards may be expected. In assessing the resulting genetic damage, Newcombe

¹ As quoted in Bird, P.M., "Radiation Protection in Canada - Part 1", The Canadian Medical Association Journal, April 25, 1964, p. 1026.

² Newcombe, H.B., Radiation, Man and His Genes, lecture at Acadia University, March 26, 1962.

concludes that "while little quantitative reliance can be placed upon current numerical estimates of risks to future generations from radiation-induced hereditary changes, there is every reason to believe that such changes are real and that they are predominantly harmful".¹ He estimates that the expected increase in serious hereditary defects resulting from a single roentgen in each generation, continued indefinitely, would be one affected individual in 10,000 births. The actual number may, however, be as much as tenfold different in either direction from the estimate because of the uncertainty in genetics about the importance of mutations as a cause of ill health and also about the past and present causation of mutations by radiation from natural sources. The upper limit of 5 roentgens per generation, which may result from future peaceful uses of atomic energy, may in a population of 20 million cause about 300 seriously affected persons per year. This, Newcombe adds, is about one-tenth of the present fatality rate from automobile accidents and 1/200th of the injuries due to such accidents.² All these risks must be interpreted in terms of the benefits derived from medical procedures involving radiation and from peaceful uses of atomic energy.

Furthermore, it must be remembered that the hazards described are not unalterably connected with the continued or even increased uses of atomic energy or X-rays, and that some protective measures already exist and will no doubt be perfected.

Fall-out from natural sources has always been and always will be with us; from atomic testing it has been reduced in recent years and hopefully will be eliminated eventually. Migicovsky's method for the removal of strontium and cesium from milk is an example of protective measures developed in Canada. The monitoring of fall-out and radiation from the use of radioactive materials is a prerequisite to effective protection.

Radiation from medical diagnostic and treatment procedures has been under careful study during recent years. As a result, our views regarding routine uses of diagnostic X-rays such as for the screening of hospital admissions or in mass surveys -- once considered among the major contributions to the effectiveness of health services -- have been revised while, on the other hand, new applications for radiology in diagnosis and treatment have been emerging. Our knowledge of the actual extent to which radiology is used is limited to the work done in hospitals, and even there statistics are subject to the vagaries of reporting. The following figures will, however, give some idea of the changing practices even though limited to public, general, and allied hospitals:³

¹ Newcombe, H.B., "Radiation Protection in Canada -- Part VI. Problems in the Assessment of Genetic Damage from Exposure of Individuals and Populations to Radiation", *The Canadian Medical Association Journal*, Jan. 23, 1965, p. 175.

² All these estimates from Newcombe, H.B., *Radiation, Man and His Genes*, op. cit.

³ Based on Dominion Bureau of Statistics, *Hospital Statistics 1956*, Ottawa: Queen's Printer, 1958, pp. 56-58, and *Hospital Statistics*, Vol. II, 1961, Ottawa: Queen's Printer, 1964, p. 62.

| <u>Number of:</u> | <u>1956</u> | <u>1961</u> |
|--|-------------|-------------|
| Patients routinely chest X-rayed on admission..... | 1,108,709 | 790,859 |
| Other radiographic examinations | 2,523,905 | 3,682,867 |
| Fluoroscopic examinations | 369,913 | 515,670 |

There was, even in the face of an increasing population and number of hospital beds and admissions, a sharp decline in routine chest X-rays taken. But while we have become more discriminating, the numbers of diagnostic radiographic and fluoroscopic examinations have increased. Greater discretion in the use of X-rays may also be the reason behind the apparent levelling off of the number of films per admission from 2.74 in 1961 to 2.66 in 1962¹.

These figures are probably indicative of the trend but they do not cover all hospitals, nor the wide range of radiological services provided outside the hospital in X-ray laboratories and the offices of the various health professionals. The extent to which X-ray equipment exists outside the hospital is illustrated by the figures for the registration of such equipment in Saskatchewan:²

| | <u>Registrants</u> | |
|-----------------------------|--------------------|-----------------|
| | <u>Number</u> | <u>Per Cent</u> |
| Hospitals..... | 150 | 52.4 |
| Dentists..... | 85 | 29.7 |
| Physicians | 20 | 7.0 |
| Chiropractors | 16 | 5.6 |
| Chiropodists | 1 | 0.4 |
| Veterinarians | 2 | 0.7 |
| Teaching and research | 6 | 2.1 |
| Miscellaneous | 6 | 2.1 |
| Total | 286 | 100.0 |

Thus, in Saskatchewan, almost half of the X-ray installations are outside the hospitals.

In the case of therapeutic radiology, the assessment of beneficial versus adverse effects can be expected to be undertaken in each individual case. Where treatment is applied, it may be expected, therefore, that its therapeutic potential will outweigh any side-effects from radiation. Such an assessment will be more difficult, however, in the case of X-ray diagnosis especially in view of the tradition of employing radiography as a routine diagnostic and screening procedure. Effective protective devices have reduced the amount of radiation both to operator and patient and as a result the individual doses are often so small that little or no somatic damage will result. But this is not necessarily true of the genetic effects:

¹ Data supplied by the Dominion Bureau of Statistics.

² Based on Williams, N., op. cit., p. 995.

"Today, the hazards associated with large doses of X-irradiation are well realized although not completely understood, and improvements in X-ray techniques have been such that the average radiation dose received during diagnostic procedures is small. Such doses are thought to have almost negligible effects upon the tissues which comprise the bulk of the body; e.g., muscle and connective tissues. With other tissues, principally those exhibiting a high rate of cell division, such as the skin, the gonads and bone marrow, this is not so; it is possible that even small amounts of radiation may cause serious effects."¹

As indicated, however, these effects have not been measured quantitatively to any degree of accuracy. The same report continues to stress the cumulative genetic effect of small doses:

"Probably the most significant effects of small doses of radiation arise when the exposure is to the gonads. Whilst the reproductive tissues will not be destroyed physically it has been suggested that ionizing radiation may so affect the genetic material present as to increase the incidence of gene mutations, the majority of which are deleterious".²

In 1952, the Ontario Tuberculosis Association established a special committee on radiation. This committee concluded that the application of modern techniques can reduce the radiation from chest X-ray examinations to "an extremely low level" and that the benefits from "properly conducted" chest X-ray programmes far outweigh any possible slight harm associated with X-ray exposure.³ The question, "are diagnostic X-ray examinations dangerous?" has been answered with a flat "no" by one author who adds, however, that this is "dependent upon our acceptance of all the practicable precautionary measures which may be taken".⁴ This statement is based on a report by the United Nations Scientific Committee on the Effects of Atomic Radiation.⁵ The answer is not so simple, however, since the genetically significant amount of radiation to the patient varies with the body site examined. Duggan found the radiation dose to the gonads from diagnostic X-ray procedures on various sites as follows:⁶

¹ Baker, P.M., *The Genetically Significant Radiation Dose from Diagnostic X-Rays in Canadian Public Hospitals*, R.P.D. — 31, Ottawa: Department of National Health and Welfare, p. 1.

² Ibid.

³ "Radiation and the Tuberculosis Chest X-ray Examinations Program", Report of the Committee on Radiation, Medical Section, Ontario Tuberculosis Association, *The Canadian Medical Association Journal*, July 15, 1958, p. 89.

⁴ Stapleton, J.G., "Are Diagnostic X-Ray Examinations Dangerous?" *The Canadian Medical Association Journal*, July 15, 1958, p. 89.

⁵ "The Responsibilities of the Medical Profession in the Use of X-rays and Other Ionizing Radiation", *British Journal of Radiology*, Vol. 30, 1957, p. 282.

⁶ Duggan, H.E., "Radiation Protection in Canada — Part IV, Factors of Importance in Minimizing Radiation Exposure of Patients, Operators and Others Involved in Diagnostic and Therapeutic Radiology", *The Canadian Medical Association Journal*, Oct. 24, 1964, p. 894.

Radiation Dosage to the Patient
(in milliroentgens)

| <u>View</u> | <u>Gonadal Dose</u> | |
|-----------------------|---------------------|---------------|
| | <u>Male</u> | <u>Female</u> |
| Chest PA | 0 | 9 |
| Abdomen AP | 20 | 241 |
| Lumbar spine AP | 14 | 284) |
| | |)702 |
| Lat. | 16 | 306+112) |
| Pelvis AP | 270 | 162 |
| Pelvimetry AP | — | 167) |
| | |)1,181 |
| Lat. | — | 798+216) |

The author contrasts the male gonadal dose from chest X-ray of zero with 1,181 as the total ovarian dose from pelvimetry. He puts the onus on the radiologist or physician in charge to ascertain that the dose of radiation to the patient is kept as low as possible¹ and strongly recommends the use of gonadal shields which in many examinations of hip joints, upper femora and portions of the pelvis can almost completely shield male or female gonads.²

Based on Baker's study of the use of diagnostic X-rays in public hospitals, Bird concludes that "among the diagnostic examinations studied, those confined to three body regions contribute practically all the genetically significant dose for both males and females".³ These body regions and the respective doses are:⁴

| <u>Annual Genetically Significant Dose</u> (mrem) | | | |
|--|-------------|-----------------------|--------------|
| <u>Site</u> | <u>Male</u> | <u>Female + Fetal</u> | <u>Total</u> |
| Pelvic region..... | 20.1 | 1.9 | 22.0 |
| Genito-urinary region | 0.6 | 1.3 | 1.9 |
| Gastrointestinal region | 0.4 | 1.5 | 1.9 |
| Total | 21.1 | 4.7 | 25.8 |

Thus, in diagnostic X-rays in the public hospitals studied, examinations of the male pelvic region account for some three-quarters of the total genetically significant dose. The greatest need for caution in the use of diagnostic X-rays then is among the young patients where the genetic and cumulative effects of radiation are of far greater significance than among older patients.

In addition to the hazards to the patient there are the risks to the operators of X-ray equipment. There again, protective devices, proper handling, and careful surveillance of exposure to radiation can greatly reduce the danger.

¹ Ibid., p. 899.

² Ibid., p. 895.

³ Bird, P.M., "Radiation Protection in Canada — Part III. The Role of the Radiation Protection Division in Safeguarding the Health of the Public", Canadian Medical Association Journal, May 9, 1964, p. 1119.

⁴ Ibid.

Measures to assess and control the hazards from radiation have been intensified in recent years. At the international level, the International Commission on Radiological Protection develops standards and makes recommendations for acceptance by national agencies. In Canada, at the federal level, the Department of National Health and Welfare assumed in 1949 responsibility for the health and safety of radioisotope workers in hospitals, universities, and industry. These responsibilities are now carried out by the Radiation Protection Division of the Department, and they have been expanded to cover every aspect of radiation that may affect Canadians of this or future generations. Similar functions are carried out at the provincial level mostly by occupational health branches or divisions in the provincial health departments; the division of labour is, broadly speaking, that the federal department's emphasis lies in the field of radioactive substances and radioactive fall-out, whereas the provincial departments concern themselves mainly with the control of radiation produced by machines such as X-ray equipment.¹ The health departments are supported in this work by a number of other agencies and technical advisory committees, including the safety committees under the Atomic Energy Control Board.

As part of its study of radioactive fall-out in Canada, the Radiation Protection Division is carrying out an extensive monitoring programme based on samples from 25 widely scattered locations, of human bone, fresh milk, wheat, soil, precipitation, and air. Studies of selected population groups are planned and special studies have been carried out or considered to investigate fall-out levels peculiar to the food-chain cycle in the North (lichens-caribou-human diet).² An important service provided by the Division is the film monitoring often required as part of a radioisotope licence. This service measures and analyses the radiation exposure of employees and it is also available to X-ray workers though at present only on a voluntary basis.

Although a wide range of protective measures as well as the means for assessing and possibly reducing radiation hazards from radioisotopes and X-ray equipment are available, legislative action to enforce the use of adequate equipment by qualified operators has been lagging behind. Table 8, published in 1964, shows that provincial legislation and other action in this field is very spotty and, therefore, far from providing the protection which scientific knowledge could provide.

While measures regarding radioisotopes may not be equally applicable in all provinces, it should be noted that in 1964 only Nova Scotia and Saskatchewan had detailed regulations applicable to X-rays.

It was the fall-out from atomic testing, relatively small in comparison with radiation from other sources, which gave new impetus to the drive for greater safety from radiation from other sources also. This drive is largely based on suspected rather than actually known ill effects, particularly in the field of genetics where we are relying largely on animal experiments pending the results of

¹ Williams, N., *op. cit.*, p. 993.

² Bird, P.M., "Radiation Protection in Canada, Part III", *op. cit.*, pp. 1114-1120.

TABLE 8
SUMMARY OF PROVINCIAL ACTIONS AFFECTING HEALTH AND SAFETY IN THE IONIZING RADIATION FIELD

| Specific Enabling Legislation Applicable to Radioisotopes | Provinces with: | | | | | | Specific Legislation Applicable to Qualifications of Radiation Technicians |
|---|--|--|--|--|--|--|---|
| | Detailed Regulations Applicable to Isotopes | AECB Authorized Inspection Officers | Advisory Committees on Radiation and Health | Specific Enabling Legislation Applicable to X-rays | Detailed Regulations Applicable to X-rays | Provisions Prohibiting Shoe - Fitting X-ray Fluoroscopes | |
| Quebec | none | Ontario | New Brunswick | Nova Scotia | Nova Scotia ¹ | Nova Scotia | Ontario (medical) |
| Ontario | | Manitoba | Manitoba | Quebec | Saskatchewan ² | Manitoba | Saskatchewan (medical and industrial) |
| Alberta | | Saskatchewan | Saskatchewan | Ontario | | Saskatchewan | Alberta (medical and industrial) |
| | | Alberta | British Columbia | Saskatchewan | | Alberta | |
| | | British Columbia | | Alberta | | | |

¹ Registration of equipment and operators.

² Registration of equipment, approval of industrial layouts, qualifications of operators.

Source: Based on Bird, P.M., "Radiation Protection in Canada, Part I", Canadian Medical Association Journal, April 25, 1964, p. 1029.

such complex long-term studies as that initiated by Newcombe with the Dominion Bureau of Statistics and the British Columbia Department of Health Services and Hospital Insurance, to determine mutation effects. Here, as with other advances of the human race, it may be unrealistic to expect that the vast benefits of nuclear energy and radiology can be reaped entirely without sacrifice but such sacrifice must be kept to the minimum which our knowledge permits us to reach.

The needs for research to increase the knowledge in this field have been pointed out repeatedly.¹ Like other agencies, the National Health Grants administration identifies radiation biology as an important area to be developed, as well as epidemiological studies of diseases related to the somatic and genetic effects of radiation. It also mentions some specific problems related to radiation protection: control of the use of X-rays, improved protection in institutions, environmental radiation surveys related to nuclear reactors and mines, radioactive waste disposal, medical supervision of radiation workers, education concerning the nature and effects of radiation, and the training of personnel in radiological health.²

Water Pollution

Air and water share the characteristic of being the most natural and convenient places for the discharge of waste resulting from man's varied activities. In both cases the amount of waste and the complexity of its composition has been rising rapidly with population growth, industrialization and urbanization, as well as with the continual development of new processes and use of new substances.

The sources of water pollution are:³

- (a) domestic - including body wastes, soaps, detergents, garbage, and other refuse. This type of waste originates from private households as well as restaurants, laundries, hospitals, hotels, and similar institutions as well as from the human element in industrial establishments;
- (b) industrial - including a great variety of wastes with an even greater variety of effects. Among these wastes are animal and vegetable rubbish, acids, alkalies, synthetics, oils, and metals.

To the industrial wastes we must also add radioactive materials.

¹ For instance, "Biological Effects of Radiation, Report of a Committee of the Genetics Society of Canada on the Needs for Research in Radiation Biology", Canadian Journal of Genetics and Cytology, March 1961, pp. 61-86; Report of the Committee on Radiation Biology of the Genetics Society of Canada, Chalk River, 1961; Brown, T.R., "Radiation Protection in Canada: Part V — Radiobiological and Radiological Health Research in Canada", Canadian Medical Association Journal, Dec. 12, 1964, pp. 1260-1265.

² Department of National Health and Welfare, National Health Grants, 1948-1961, Ottawa: Queen's Printer, 1962, p. 103.

³ Based on U.S. Federal Security Agency, Environment and Health, Public Health Service Publication No. 84, Washington: U.S. Government Printing Office 1951, pp. 15-17.

It has been said of the United States that more than half of the pollution is the effect of industrial wastes,¹ a proportion which is probably increasing.

Compared with industrial wastes, those from domestic sources have been considered as relatively uniform and consistent in their chemical behaviour.² But the growing domestic uses of chemicals increase the hitherto comparatively simple technical treatment problems of largely organic waste matter. Household detergents are an example of synthetics replacing the old fashioned soap. Detergents are "relatively resistant to biological attack and are not precipitated by calcium and magnesium ions in hard water."³ Therefore, detergents are not removed as effectively as soap in treatment plants or degraded biologically in streams and soils. Only about 50 per cent of the pollutant chemical is removed during the usual biologic treatment and it persists for long periods in streams because of its resistance to biologic degradation. It is found in concentrations of the order of 10 parts per million in municipal sewage, somewhat higher in household wastes and in about 60 to 100 parts per million in laundry wastes. This chemical has some corroding effects and is chiefly objectionable because of the persistent foaming. It should not be present in drinking water in a concentration of more than 0.5 parts per million.⁴ Of greater significance, however, may be the phosphates contained in detergents because of the algae they produce which are detrimental to life in the bodies of water where they are present.

In industrial wastes the complexity of pollutants is still greater and often less calculable. For example, alkaline wastes may at one point be a nuisance but at another point they may offset the effects of acid waste from another source.⁵

We have been very largely successful in controlling water-born diseases. This is true of cholera and typhoid fever, though the latter still occurs sporadically. Polluted water has been incriminated more recently in outbreaks of polio and infectious hepatitis. Modern industrial wastes, however, require new and different methods of control, different from those which proved effective in counteracting pollution mainly from domestic sources.

The wide-spread pollution and the resulting health hazards are not limited to communal water supplies for industrial and domestic uses, but they extend also to the many uses of water - both fresh and salt - for recreation and agricultural purposes such as irrigation of crops and feeding of animals. Unpolluted water is also needed in food processing. Pollution is a threat not only to human health directly but also to fish and wild life as well as to the vegetation drawing on the

¹ Ibid., p. 16.

² Ibid., p. 17.

³ "Detergents as a Health Hazard", editorial, Canadian Medical Association Journal, May 2, 1964, p. 1089.

⁴ Ibid.

⁵ U.S. Federal Security Agency, op. cit., p. 17.

water supply. It includes conditions favouring the production of mosquitoes and other insects as well as the chance exposure to polluted water of people at work or play.¹

The possible remedy lies partly in the solution of technical problems particularly in regard to the safe disposal of industrial waste. Very largely, however, it is a matter of enforcing existing regulations and coordinating municipal, provincial, and federal government efforts in this direction. This applies to the treatment of communal waste as well as to industrial waste disposal. In the latter case it is a matter, very much as in the case of air pollution from industrial establishments, of counteracting or preventing the pollution at the source.

The extent and degree of water pollution in Canada are difficult to assess quantitatively because of the many and varied substances contributing to pollution, and also because of the already mentioned often complex interaction of various chemicals. Pollution also depends very largely on currents and the rate of flow in the affected bodies of water. The rate of flow, in turn, varies with the seasons and the amount of precipitation. In many cases it, too, is man-made and regulated by the operation of dams in lakes and rivers. Rural water supplies for domestic and feeding purposes are often more remote from industrial pollution but subject to sometimes inadequate sanitary precautions in the disposal of human waste and that of considerable concentrations of animals. In the case of ground water, the degree of pollution may vary with the water table.

Only in regard to communal water supply and waste disposal are there statistics giving a general picture for the whole country.² Table 9 illustrates the present situation and recent trends. Since the figures shown in the table are based on estimates, the percentages must be taken as approximations only and comparisons should be limited to broad categories rather than exact figures. The percentages of the urban population were added because the systems in question will largely, though not necessarily, be found in urban areas. Where the percentage for the urban population exceeds 100, it may be due partly to an under-estimate of the urban population as noted in the table. Small differences may also be due to the fact that these are estimates, as well as to varying interpretations of rural and urban.³ Some of the percentages over 100 may also indicate the existence of water or sewerage works in areas not classed as urban. It should be noted that because of the population increase, even greater numbers covered in 1963 may result in reduced percentages in that year. The figures indicate a very slow improvement, if any, in the situation. Projects of both kinds seem to barely keep up with the increasing need resulting from population growth and the continuing trek towards the urban centres.

¹ Stead, F.M., "Levels in Environmental Health", *American Journal of Public Health*, March 1960, p. 312.

² Based on data supplied by the Department of National Health and Welfare.

³ According to the Census, communities with populations of 1,000 or more are classed as urban as are the fringes of certain urban areas.

TABLE 9
ESTIMATED POPULATION SERVED, AND PERCENTAGE OF TOTAL AND URBAN POPULATION,
BY WATERWORKS AND SEWERAGE WORKS SYSTEMS, CANADA AND PROVINCES, 1960 AND 1963

| | Population Served by ¹ | | | | Per Cent of Population Served by | | | | | | | |
|--------------------------------|-----------------------------------|------------|----------------|-----------|----------------------------------|-----------|------------------|-----------|-------------------|-----------|------------------|-----------|
| | Waterworks | | Sewerage Works | | Waterworks of | | | | Sewerage Works of | | | |
| | 1960 | 1963 | 1960 | 1963 | Total Population | | Urban Population | | Total Population | | Urban Population | |
| | | | | | 1960 % | 1963 % | 1960 % | 1963 % | 1960 % | 1963 % | 1960 % | 1963 % |
| | | | | | | | | | | | | |
| Newfoundland..... | 147,000 | 147,000 | 143,000 | 143,000 | 33 | 31 | 64 | 60 | 30 | 30 | 63 | 58 |
| Prince Edward Island | 28,000 | 30,270 | 35,000 | 36,250 | 27 | 28 | 85 | 88 | 34 | 34 | 106 | 106 |
| Nova Scotia | 355,000 | 367,000 | 300,000 | 310,000 | 49 | 49 | 90 | 90 | 41 | 41 | 76 | 76 |
| New Brunswick | 203,000 | 255,650 | 191,000 | 202,400 | 34 | 42 | 75 | 91 | 32 | 33 | 70 | 72 |
| Quebec | 3,261,000 | 3,261,225 | 2,421,000 | 2,421,225 | 63 | 60 | 86 | 81 | 47 | 44 | 64 | 60 |
| Ontario | 4,250,000 | 4,500,000 | 3,850,000 | 4,000,000 | 70 | 70 | 90 | 91 | 63 | 62 | 82 | 81 |
| Manitoba | 526,000 | 616,231 | 518,000 | 604,330 | 58 | 65 | 91 | 101 | 57 | 64 | 89 | 99 |
| Saskatchewan ... | 393,000 | 469,320 | 397,000 | 482,224 | 43 | 50 | 100 | 117 | 43 | 52 | 101 | 120 |
| Alberta | 684,000 | 891,655 | 685,000 | 896,477 | 53 | 63 | 84 | 101 | 53 | 64 | 84 | 101 |
| British Columbia | 1,310,000 | 1,310,000 | 839,000 | 839,000 | 82 | 77 | 112 | 106 | 52 | 49 | 72 | 68 |
| Yukon | N.A. | 5,200 | N.A. | 5,300 | N.A. | 35 | N.A. | 102 | N.A. | 35 | N.A. | 104 |
| Northwest Territories | N.A. | 7,190 | N.A. | 3,500 | N.A. | 30 | N.A. | 77 | N.A. | 14 | N.A. | 37 |
| CANADA | 11,157,000 | 11,860,741 | 9,379,000 | 9,943,706 | 62 | 63 | 90 | 90 | 52 | 53 | 76 | 76 |

¹ Data supplied by the Department of National Health and Welfare.
Note: The percentages are based on these data related to the estimated total population in 1960 and 1963; as the rural-urban distribution is not available for these years it was assumed that the proportions would be the same as in the Census year 1961. There is no doubt, however, that the trend towards urbanization continued from 1960 to 1963, and as a result the percentages shown for the urban population in 1963 will be somewhat too high, and that for 1960 somewhat too low.

It is also interesting to note the increasing number of people and the percentage of the total population being served by controlled fluoridated water supplies. Between the years 1960 and 1965, the number of people in areas thus served has risen from just over one million to just over four.¹ This represents 6 per cent of the population in 1960, and 20 per cent in 1965.

The Animal World, Pesticides, and Human Health

Reference has been made on several occasions to man's interdependence with plant life. Plants provide food, a great many raw materials for industry, and they can influence climate and soil conditions. All these important functions may be affected by air or water pollution and other human activities. The same applies to the animal world. Man's nature being closer to, or part of, the animal kingdom, many of the health aspects in one are more immediately reflected in the other. There are diseases common to both, and animals act as hosts or vectors for certain diseases to which man is susceptible. For the same reasons, animals provide valuable substances for human immunization. Animal products serving as human food represent generally greater problems of storage and spoilage than do vegetable products.

There may be as many as 100 diseases which are known to be transmissible from animal to man. Only relatively few of these present a serious problem in Canada, largely due to the continuous and effective effort on the part of Canada's veterinary services to control and prevent the spread of these diseases; the veterinary services, like the preventive services of the health departments, are often too much taken for granted.

Both wild and domestic animals may harbour diseases transmissible to man, apart from direct injuries which they may inflict by bite or otherwise. Rabies, which may occur in a wide range of wild and domestic animals and may be transmitted from one to the other, has become rare among humans in Canada, although two fatalities did occur in Ontario in 1959. Surveillance of the spread of the disease among wild life and preventive vaccination of domestic animals, including the sled dogs in the North, have greatly contributed to the control of rabies in Canada.

Bovine tuberculosis and brucellosis have until fairly recently constituted major foci for infection for humans. In both cases, rigid and systematic control measures under the auspices of the Health of Animals Branch of the Federal Department of Agriculture have considerably reduced these hazards and paved the way for their complete eradication.

In the drive against bovine tuberculosis, 49 million cattle have been tested over the years, and 570,000 reactors removed. Now the level of infection among cattle stands at about 0.087 per cent, requiring some 1,100 head to be tested to

¹ Data supplied by the Department of National Health and Welfare.

uncover one reactor. These control measures as well as the pasteurization of milk have virtually eliminated bovine tuberculosis as a cause of the disease in man in Canada.¹

Brucellosis, or undulant fever, transmitted to man similarly as bovine tuberculosis by contact with infected animals, their tissues or secretions, and by ingestion of unpasteurized milk or dairy products from infected animals.² A testing and vaccination programme among cattle herds has been in progress for about eight years now with the result that about 90 per cent of Canada's cattle population have been so screened, and it is anticipated that the entire country will be covered within another year or so.³ Both the tuberculosis and brucellosis programmes involve testing and vaccination of cattle, destruction of infected animals and compensation to the owner, as well as follow up.

Unlike tuberculosis where bovine infection constitutes only one of the sources of the disease in man, brucellosis is due entirely to the contact with animals and their products. Hence the extensive control activities are directly reflected in the declining incidence of the disease in Canada:⁴

| | Cases | <u>Number of</u> Deaths |
|----------------------|-------|----------------------------|
| 1951-1955 mean..... | 140 | 2 |
| 1956-1960 mean. | 127 | 1 |
| 1961 | 109 | — |
| 1962 | 98 | 3 |
| 1963 | 57 | — |

Tuberculosis and brucellosis are only two of the numerous diseases transmissible from animal to man. All of these can be kept under control only with considerable effort and cost; two specific control programmes have been mentioned here to give some idea of the administrative organization required and the cost involved not only in its operation but also in compensation paid to farmers for animals destroyed because of the disease. The year 1965 brought an outbreak of equine encephalitis, a disease transmitted to man by mosquitoes, with about ten times as many human cases in Canada as in other years.⁵ Mention should also be made of the elaborate precautions governing the import and export of domestic animals and their products. These activities are all carried out under the Animal Contagious Disease Act of Canada.

¹ Wells, K.F., "Sanitary Position and Methods of Control Used in Canada", Office Internationale des Epizooties — Bulletin, 1962, pp. 749-759.

² American Public Health Association, Control of Communicable Disease in Man, New York: The Association, 1955, pp. 30, 196.

³ Wells, K.F., op. cit., p. 751, and information supplied by the Department of Agriculture, Ottawa.

⁴ Data supplied by the Dominion Bureau of Statistics.

⁵ Dominion Bureau of Statistics, Notifiable Diseases — Weekly Summary, 36th Week, Ottawa: Queen's Printer, 1965, p. 2.

Related to these activities of the Health of Animals Branch and its provincial counterparts are those falling under the Canada Meat Inspection Act providing for the compulsory inspection of meat and meat products for interprovincial and export trade. About 90 per cent of Canada's meat production come under the provisions of this Act, the remainder being covered by provincial provisions. Federal inspection ends at the packing stage. One of the results of meat inspection in Canada, as compared with other countries,¹ is the low rate of trichinosis due to eating untreated pork products.

The maintenance and strengthening of the various control measures become more important with the greater mobility among animals as well as farmers. The animal during its lifetime is becoming more likely to be kept on several farms, and farmers range more widely geographically in the purchase and sale of animals.²

Similar considerations as to domestic animals apply to the supply of safe fish and other sea-food products. The problem here is not so much one of transmission of diseases, except in the case of some mollusks, but the greater propensity to spoil. Because fish and other sea animals live at lower temperature than the land animals, and also because of their unsaturated fat content, their products decompose more rapidly and therefore present greater problems of proper storage. The traditional methods of preserving them by drying, smoking, or salting are increasingly being replaced by refrigeration, with smoking and salting used chiefly to impart flavour.³

The supply of meat and fish safe for human consumption still represents a problem in remote areas, particularly in the North when proper inspection, storage, and preparation of such foodstuffs are often lacking.

The problem of meat inspection and proper processing and storage of meat, fish, and other animal products leads back to the previously mentioned need for an extensive system of controlling foodstuffs reaching the Canadian consumer.

One of man's ways of protecting or freeing himself from inimical or unpleasant forces in nature is the increasing use of a growing variety of chemicals: the pesticides. Both the term pest and pesticide cover a great variety of objects and substances. Many of these as well as their health implications have implicitly been discussed under various headings of this review of man's relationship with his natural environment. Pesticides contribute to the pollution of air, water, soil, and food. The meaning of the term pest in this context is very vague and based largely on the rather naive, emotional, and often subjective classification of animals into good and bad: a bee in a city backyard is a pest but to the honey farmer it is like one of his other domestic animals, very much like some plants that are weeds to the farmer may be wild flowers to the city dweller. When we speak of pests we

¹ Information supplied by the Department of Agriculture, Ottawa.

² Berry, C.H., "Organized Research in Agricultural Health and Safety", *American Journal of Public Health*, March 1965, p. 424.

³ Information supplied by the Department of Fisheries, Ottawa.

generally mean insects or small animals such as rats, as well as weeds which are the objective of chemical weed killers. Insects, mites and ticks may be disease vectors, such as the anopheles mosquito carrying the malaria parasite. Unsanitary waste disposal may attract flies or other insects capable of spreading germs to the human community. Chemical insecticides are used against insects which represent a threat to man's health; but very largely pesticides are employed also in agriculture and forestry, in which case it is the chemical residual which indirectly may be detrimental to man's health. Danger from pesticides may result to 1) those who use them, 2) the consumers of the crops and animals from the areas where they have been employed, 3) wild life, and hence 4) the public that may come in contact with them.¹ The way in which pesticides may affect human health is summarized by Williams as follows:

"Some of the pesticides, chiefly those in the chlorinated hydrocarbon group (e.g., DDT, dieldrin), have the quality of persistence. Some are broken down very slowly, if at all, in nature, and therefore persist on the plants sprayed, in the soil, in water draining from the contaminated soil, in animals and birds which consume the contaminated vegetation or insects, and in fish in contaminated waters or which consume marine life which concentrates the pesticides."²

As in the case of radiation, there is evidence of some immediate adverse reaction to pesticides under certain circumstances, but little is known of any long-term effects. Furthermore, as in the case of radiation, there is reason to suspect that continued or repeated exposure to pesticides and their residuals may lead to chronic conditions. Davignon and his colleagues, who studied this problem, state:

"To a certain extent, everyone is exposed to small amounts of insecticides, by ingestion, inhalation or skin contact; and to study the chronic effects of these products in the human organism it is first necessary to find a group of persons who have had important and prolonged contact with them, sufficient to cause disturbances."³

To study the chronic effects of each insecticide separately, the same authors conclude, was not possible because of the difficulty of finding a sufficiently large number of persons who have used a single product for a sufficiently prolonged period.⁴ In a study of apple-growers using insecticides, they found ill effects felt by 26 per cent during the spraying season, and assume that "insecticides may have some chronic effect on man",⁵ but to ascertain this, further study is required.

As with other technical advances, such as nuclear energy, or the automobile, pesticides have become essential, particularly to agricultural production and disease control; man cannot be expected to abandon them but he must be aware of

¹ "Pesticides and Public Health: Benefits and Problems", *American Journal of Public Health*, December 1962, p. 2111.

² Williams, N., *Recent Advances in Physical Science and Public Health*, Paper presented at the Annual Meeting of the Canadian Public Health Association, Edmonton, June 2, 1965; reserved for publication by the *Canadian Journal of Public Health*.

³ Davignon, L.F., et al., "A Study of the Chronic Effects of Insecticides in Man", *Canadian Medical Association Journal*, March 20, 1965, p. 598.

⁴ *Ibid.*

⁵ *Ibid.*, p. 601.

the possible hazards they entail. In regard to radiation, it was the public concern with atomic testing which sparked more careful attention to radiation hazards from all sources. Pesticides came into the limelight with Rachel Carson's "Silent Spring" when she posed the question "Can anyone believe it is possible to lay down such a barrage of poisons on the surface of the earth without making it unfit for all life?"¹ Even if the experts tell us convincingly that her conclusions are exaggerated—and it is also difficult to see how her suggested methods of biological solutions or chemo-sterilants would not also upset the balance of nature - her book provided the jolt necessary to arouse experts and public alike from their lethargy and indifference to a potentially very dangerous situation. The fact that living organisms have developed resistance to some chemicals is a sign that the balance of nature has not yet been upset. But even the experts pleading the case for the continued use of pesticides warn that we have been crude in our methods of applying them.² In our optimistic flush over eradicating the pests we may fail to see that both means and ends of man's dominance over nature require constant appraisal.³ The solution seems to lie in replacing broad-spectrum pesticides with kinds that are more specific in substance and application, in a more discriminate use of these substances, and particularly also in close study of observed and potential effects of existing and newly introduced pesticides. The American Public Health Association has this answer to Rachel Carson's Cassandra call, which applies to Canada as well:

"The problems raised by these products of modern science and technology are real and urgent, and to dismiss them because they have been raised in a sensational and distorted manner would be foolish. Government, industry and the consuming public all have an important stake in dealing with these problems, but action should be taken only in terms of objective, accurate knowledge, not in terms of emotion and conjecture."⁴

CONCLUDING NOTE

This review of the changing characteristics of the people, their circumstances, and their environment could deal with selected aspects only, and some of the more tangible ones. It can be said, however, that variables like educational achievement, income, or occupation are indicative also of other, often more subtle and elusive attributes, many of which may be summarized into the concept of social status in the community. We have not as yet discussed various forms of illness as such but some of their demographic, social, and environmental determinants which are increasingly recognized as factors in health and disease: "In the application of the biological and physical sciences to medical problems, it has become increasingly apparent that the understanding of health and disease requires a holistic frame of reference in which the psychological, social, and cultural aspects

¹ Carson, R., *Silent Spring*, Boston: Houghton Mifflin Co., 1962, pp. 7 and 8.

² Williams, N., *op. cit.*

³ Rudd, R.L., *Pesticides and the Living Landscape*, Madison: University of Wisconsin Press 1964, P. X.

⁴ "Pesticides and Public Health: Benefits and Problems", *op. cit.*, p. 2113.

of behavior are appropriately related to those of the biological nature of man and the physical environment in which he lives''.¹ The information contained in this chapter is intended to provide some of this holistic frame of reference for the discussion of the health aspects proper.

It is a very general outline describing broad trends, relating mostly to the Canadian people as a whole. Regional studies and studies of specific groups of the population could considerably refine the picture given here. As it is, however, it cannot tell the physician, the nurse, or the medical social worker what to expect when they first contact a patient or enter a home, but it may provide the health worker with sufficient background and with some suggestion of what to look for. Averages are the least suitable of the measures of central tendency to express the likelihood of actual situations. Depicting general trends, however, they may help to create an awareness of the many and varied forces at work in molding and changing the Canadian people and its society, forces which have to be taken into account when assessing the health and the need for health services as social phenomena.

Some of these relationships were pointed out in a study prepared for another Canadian Royal Commission over twenty years ago:²

"Malnutrition, poor and crowded housing, and overwork, especially on the part of the mother, are causes of illness beyond the limits of medicine in the accepted sense and link up the field of public health with the general field of welfare. Thus any steps - legislative, social or economic - that help do away with poverty, are fundamental contributions to the field of public health. The minimum wage and adequate housing may be as potent forces for public health as vaccine."

and:³

"It is becoming more and more realized, however, that density of population, overcrowding of houses, space for recreation, the maintenance of ample space for light and air about buildings, and zoning to accommodate various town functions, have a direct effect upon the public health."

While it has been said that "levels of health, as expressed in patterns of mortality and morbidity, are roughly associated with the level of arts and sciences in a given society and with the habits and beliefs of its population'',⁴ care must be taken to distinguish between a relationship of association and an actual cause-and-effect relationship. The latter type of relationship exists no doubt between many of the factors discussed in this chapter and the health of the people, but in many cases the relationship is a subtle one, often recognizable only over a period of time and even then it is often not possible to associate one specific event or

¹ Straus, R., and Clausen, J.A., "Health, Society, and Social Science", *The Annals*, March 1963, p. 4.

² Grauer, A.E., *Public Health, a study prepared for the Royal Commission on Dominion-Provincial Relations*, Ottawa: King's Printer, 1940, pp. 2, 3, 38.

³ *Ibid.*, p. 38.

⁴ Anderson, O.W., Lerner, M., *Measuring Health Levels in the United States, 1900-1958*, Health Information Foundation Research Series II, New York, 1960, p. 7.

situation with a specific effect such as we can establish, for instance, between the application of the polio vaccine and the declining incidence of this disease. Reference has been made to the conceptual problems in defining and measuring health or fitness; the physical and mental stress phenomena are of a complex nature, as is the etiology and the course of chronic diseases.

These complex relationships require a complex study of the epidemiology of health and disease, more complex than it was when the problems were mainly those of the communicable diseases. This is what Wolman describes as the new dependence of the health officer upon this wider epidemiological inquiry "into the subtle impact of environment upon man".¹ The more complex epidemiology and ecology, in turn, need more sophisticated and elaborate statistical tools than sufficed when all that was needed was a count of cases and their distribution.

In the attempt at defining health, in the previous chapter, it was proposed to limit the discussion primarily to the various aspects of physical and mental health, with only the necessary reference to social well-being as a health component. But we cannot ignore the effect of matters of social well-being or its lack upon physical and mental health, which again points up the difficulty of distinguishing in some situations between the areas of health, welfare, and other social spheres.

If we spoke of health as a demographic variable, it should be added that "it is not only a dependent variable which is resultant of the demographic, social, and economic characteristics, but it is in itself an independent variable which in part determines or affects the other economic, social, and demographic factors".² This has been recognized by the students of population problems, as in an annual report by the Rockefeller Foundation: "The doctor, the agricultural scientist, and the economist are working as parts of an inseparable whole, and a joint attention to the population problems serves to remind each of the whole",³ and this is perhaps part of what Dewey refers to when he speaks in his *Philosophy and Civilization* of the close alliance in ancient times between medicine and philosophy.

Rosen summarized these thoughts when he said of international problems:

"Poverty and disease are linked through inadequate nutrition, housing, clothing, insanitary living conditions, and prevalent cultural values. In turn, these are linked with low income and lack of education. Thus, the importance of economic, social, and political factors in determining the health status of people renders it imperative to take a comprehensive approach."⁴

Generalities? Of course they are. But they will remain so only as long as we do not succeed in pinpointing the various relationships and establishing direct cause-and-effect connections as well as possibly quantifying them.

¹ Wolman, A., *op. cit.*, p. 1636.

² Linder, F.E., *Health as a Demographic Variable*, address prepared for the Conference of the International Union for the Scientific Study of Population, Vienna, 1959, p. 3.

³ The Rockefeller Foundation, *The President's Review*, Annual Report 1954, p. 42.

⁴ Rosen, G., "Man and His Changing Environment — Historical Perspective", *American Journal of Public Health*, July 1961, p. 1013.

In the meantime, however, we can do no more than create a greater awareness of these determinants of the health status of a people and of the vanishing borderlines between disciplines and departmental jurisdictions.

Only some of the environmental aspects could be discussed there, but there is hardly anything in man's environment or in what he does or does not, which not in some way affects his physical or mental health. While changes in the environment, habits, or way of life generally may have more profound effect on health than some new drug or surgical procedure, the former effect is more complex and therefore more difficult to establish. In this field particularly, the study of the etiology or epidemiology of health and disease must beware not to confound association with causation. Associations may provide helpful leads but not definite answers. In his *Natural and Political Observations on the Bills of Mortality* by Capt. John Graunt, the author examines healthful and "sickly" years. The year 1660 was a healthful one, he found, and he comments:

"As to this year 1660, although we would not be thought superstitious, yet it is not to be neglected, that in the said year was the King's restoration to his empire over these three nations, as if God Almighty had caused the healthfulness and fruitfulness thereof to repair the bloodshed and calamities suffered in his absence. I say, this conceit doth abundantly counterpoise the opinion of those, who think great plagues come in with Kings reigns, because it happened so twice, viz. anno 1603, and 1625; whereas as well the year 1648, wherein the present King commenced his right to reign, as also the year 1660, wherein he commenced the exercise of the same, were both eminently healthful: which clears both monarchy, and our present King's family, from what seditious men have surmised against them."¹

Just because the King happened to ascend the throne and the same year was also a "healthful one", does not mean the King brought it about.

It is now recognized that medical care alone is not enough to preserve or restore health. The Canadian Medical Association re-emphasized this in a recent policy statement:

"In as much as the health of the people depends to a great extent on the environmental conditions in which they live and work - upon security against want; upon adequate nutrition and clothing; upon educational facilities; upon suitable housing and reliable sanitation; and upon opportunities for exercise and leisure - the community carries a major responsibility in initiating and extending these services. The fulfilment of these needs is an indispensable corollary of quality medical care."²

This chapter intends to provide some of the background material for such an approach by the medical practitioner, the other members of the community health team, and the community at large. Population growth, for example, means not only a proportional rise in the need and demand for health services; it also will bring about a corresponding increase in environmental health needs, including safe and adequate food and water supplies. Regarding the latter, we may, for instance,

¹ Graunt, J., *Natural and Political Observations on the Bills of Mortality*, London: A. Millar, 1759, p. 21.

² "Educational Programs on Health and Health Insurance", *Canadian Medical Association Journal*, April 24, 1965, Views on the Economics of Medicine.

expect over the next fifteen years or so a doubling of the present demand on North America's ground water resources with all the resulting problems of keeping these resources intact and safe.¹ We must also be aware that every 1,000 persons added to the population will require an additional 100,000 gallons of water daily; will produce 68,000 pounds of non-industrial air pollutants each month; will require the disposal of 365 million gallons of liquid wastes each year; and will necessitate the collection and disposal of 750,000 pounds of refuse annually.²

Reference has been made to the many and increasing man-made changes in our environment. We cannot hope and would not wish to end all interference with the natural environment, undoing what changes man has already brought about. This could be done only at the cost of abandoning the many technical advances essential for our modern standard of living and not in the least for our present improved health status. We must, on the contrary, expect more and more man-made devices to come between him and nature. Some of these devices are aimed directly and specifically at the control of natural health hazards. Others, incidental to new industrial processes and changing practices in our daily life, will create new hazards to life and health. Being both unable and unwilling to halt or reverse this trend, it is essential to have on hand a continuous system of study and surveillance to detect and counteract the ill effects incidental to technological advance. Kehoe has warned:

"The technology of our time has created a wealth of materials and made available the forces of nature for man's use. At the same time, it has failed to bring to these materials and forces the understanding of their biological effects that will keep them under adequate control. The effort must be made to reduce the gap between technology and biology before it is too late. It is clear that reckless man can turn loose and build up physical forces which may destroy himself and his kind The new and dangerous environment that man has created for himself now provides a challenge to both curative and preventive medicine -- a challenge that requires additional types of medical knowledge, new skills and new settings for application of such knowledge and skill."³

There are new and challenging tasks for the environmental health worker in the widest sense. Once the importance for health of these factors is fully recognized it should result in a systematic approach, and continuous study and action without in each case waiting for the vagaries of public opinion to become emotionally aroused over a specific issue.

¹ Fleming, J.R., "Environmental Management — A Twentieth Century Public Health Challenge", *Canadian Journal of Public Health*, January 1965, p. 3.

² *Ibid.*, p. 2, quoting D.F. Metzler.

³ As quoted in Rogers, F.B., "Man and His Changing Environment — Historical Perspective", *American Journal of Public Health*, November 1961, p. 1641.

LIFE AND HEALTH OF CANADIANS

“No more fundamental problem confronts the health administrator than the measurement of the level of health of his community; and nothing could be more valuable than to have at his command one or more measuring rods to help him in this task and also in assessing his specific problems relating to the health of the people, in designing his plans to deal with these, in guiding his administration and in evaluating his schemes.”

World Health Organization —
Measurement of Levels of Health.

THE SETTING

The present and future health status of the Canadian people are the result of medical science and its application, but they are also influenced very largely by such social, economic, and environmental factors as have been reviewed in the previous chapter. Some of these factors — like improved standards of living, better nutrition, improved general sanitation — make for better health, others — like lack of physical exercise, excessive drinking or smoking — are deleterious, and others still — like radiation, the use of pesticides and other new substances — are yet not fully evaluated in terms of their effect on health. The influence of most, if not all, of these factors on the health of the people is often subtle and gradual, and of a general rather than a specific nature.

Some of these varied forces are interacting; some supplement each other, and some tend to compensate one another's effects. The end result of the complex relationships as well as of the fruits of medical science and the organization of health services is manifested in the health of the people. In Chapter 1, we examined a direct approach to evaluating and measuring health as a positive state, and attempted to answer the question, “how healthy are Canadians?” The many obstacles encountered in this attempt leave us with the task of applying what means there are at our disposal to measure health largely in terms of its negative aspects, i.e., illness, disability, and death.

Even then, however, the measurement of health is beset with numerous difficulties. The transition from health to ill health — or morbidity — is often a gradual one and hence the decision where one state ends and the other begins

is based more often on judgment rather than objective criteria. Frequently we have to rely on the subjective judgment, or the art rather than the science, of the physician. The same applies to the state of disability: one person will carry on his usual activities with the same symptoms or illness which will keep another from following his daily routine of work, school or play. Similarly, the decision to see a doctor or dentist, to enter hospital, or to follow a certain course of treatment will vary among the people with the same kind of health problem. Thus, objectivity and uniformity of measurement will often be lacking throughout the course of illness until the climax of severity, namely death, is reached.

This is one reason why the measurement of mortality has continued to be the most reliable single indicator of health conditions. It can, however, no longer remain the only such indicator. One of the spectacular results of the advances in health care is the effective control of some once fatal diseases, particularly the infectious ones, and the elimination of fatality or its postponement in the case of other diseases. Also, the impact of many long-term diseases, which constitute most of our major health problems today, lies not only in their fatality – for some like mental disease or arthritis have very low fatality rates – but also in their duration, the extent and degree of disability they cause, and the amount of services they require. These aspects are not reflected in mortality data. But as soon as we move away from the clearly identifiable event of death to other characteristics of morbidity, we encounter difficulties in reliably and objectively establishing the facts. Scientific efforts to quantify the non-fatal characteristics of morbidity are relatively new, and little or no effort has so far been made in Canada to establish an integrated system of data collection to supplement the well-established mortality statistics. The briefs submitted to the Royal Commission on Health Services contain many references to the inadequacy of data concerning Canada's health status and health needs. For historic trends we have to rely entirely on mortality and some hospital statistics. Comparisons with other countries also must be limited largely to mortality statistics. But while mortality statistics based on the registration of vital events have been well established in Canada for many years now, they have not entirely kept pace with the needs resulting from today's health problems. They have, for instance, not as yet been adapted to a meaningful analysis of the complex morbidity patterns experienced among the old and chronically ill.

It is precisely because of the absence of a system of current health statistics that this study has become necessary. In addition, the inadequacy of existing data makes it necessary to use sources which are often limited in scope or outdated so that some judgment will have to be made regarding their current and general validity. Yet, despite these drawbacks the findings of this study may nevertheless represent a reasonable general assessment of the health status of the Canadian people and of the main health problems facing our nation today.

THE HEALTH OF THE CANADIAN PEOPLE TODAY

If, as we have seen, health as such cannot be measured, how then can we obtain some picture of the health status? To describe someone's health on a

given day, for instance, we would probably first ask if he is feeling well or not. This, in a very crude way, separates the healthy from the ill. To find out how ill someone is, we want to know whether he is suffering pain, but this is something for which there is no gauge at all. Other indications of severity could come from questions such as: is he able to carry on with his regular activity, whatever it may be? Did he see a doctor? Does he have to go to the hospital? And ultimately, did he die? This will give us some idea of how sick the person is, and we may take these items as criteria of the health status of an individual as well as of the community as a whole. It will provide us with some measure of the extent of life and health of the people which is the subject matter of this chapter.

What then may we expect to find in terms of the characteristics mentioned if we looked at our community today? If we take a city or region with a population of 100,000 – representative in age and sex composition and other circumstances of Canada's population as a whole – its health picture will look something like this:

Of the 100,000 people:

86,000 will feel nothing wrong with them;

14,000 will be sick or show some symptom of illness;

of these:

3,500 will be disabled from carrying on their usual activity;

1,500 will see a physician;

900 will be in hospital;

40 will be admitted to a hospital;

2 will die on that day;

6 babies will be born that day.

Graphically, the picture would present itself roughly as shown in Figure 6. The sources mentioned in the chart will indicate to the reader the numerous limitations inherent in the estimates. Among them are the doubtful validity today of the Canadian Sickness Survey data; the estimate of physicians' calls assumes the coverage of all Canadians by some insurance or prepayment plan since it is intended here as an indication of the seriousness or severity of illness rather than a measure of actual physicians' services; while the estimates are adjusted for age and sex, Saskatchewan may be expected to have a larger proportion of rural practice and perhaps a different proportion of specialists than the rest of Canada; the graphic presentation over-simplifies in that it shows persons with physicians' services as a stage between disability and hospitalization, whereas these services actually cut across these divisions and even include some services to apparently healthy people. The intent, however, is to show the relative magnitude of the various items, and in that respect the picture is probably by and large correct: on an average day of the year we will find that

about six-sevenths of the people carry on unhampered by any sign of illness. The number of those in hospital or admitted refers to hospitals of all types, including mental and tuberculosis institutions. Included as illness are conditions arising from even normal pregnancy and delivery; though these are not morbid conditions, they do incapacitate and require health services.

This then is the situation we may find in the community on a given day. Whether we can say, however, that the 86,000 people – or six-sevenths of the population – who show no sign of ill health that day are actually healthy, is a different question.

Taking Canada as a whole on an average day in 1964, we would find that the vast majority of Canadians, some 16 million, are carrying on as usual. But over 2 million will be less than well. Over 600,000 will be unable to go to work or do whatever they could or should be doing if they were in good health. About half of a million will be laid up (about one-third of them in hospitals,) and there will be close to 400 deaths every day.

Among the apparently healthy there is likely to be some undetected illness; we know that some of these people have been sick before and that some will fall ill perhaps the next day or at some time in the future; all of them will suffer some terminal illness. This leads into the longitudinal concept of health, as has been discussed in the first chapter.

When Solon, the statesman of ancient Athens, said that a man's fortunes cannot be judged until he dies, he stated something which is very relevant also to judging health. In some respects, this approach is essential and has been employed in health and demographic statistics. The length of life, a very important health indicator, can be measured only at the end of the lifetime; what is true of the duration of life is true also of the quality of life. We would be in a much better position to appraise the health status of people if together with their death certificates we had a record of their periods of health and illness, weighted perhaps to indicate at what period of their life illness or disability occurred. Such a score would then enable us not only to determine years of life lost but also periods of health lost. In a similar fashion we appraise the experience of hospital patients at the time of their separation when we have the complete picture of their hospital stay. This type of stock-taking remains beyond our reach, however, at least for the time being.

Statistics of the census type which give a cross section (theoretically as of a certain point of time but in practice often as of a certain day such as in the foregoing example) also have many and important uses as demonstrated by the population census, censuses of hospital patients, and others.

Somewhere in between these two approaches lies the practice of assessing various experiences over one year's duration. This is the established practice

in administration and business. In the health field annual rates have been used ever since the very first beginning of health statistics over 300 years ago. John Graunt observes in regard to the bills of mortality that,

“These bills were printed and published, not only every week, on Thursdays, but also a general account of the whole year was given in upon the Thursday before Christmas day: which said general accounts have been presented in the several manners following, viz., from the 1603 to the year 1624, inclusive, according to the pattern here inserted.”¹

Annual rates of births, deaths, marriages, hospital admissions and days, incidence and sometimes prevalence of diseases, have become standard equipment in health statistics. They are supplemented sometimes by reports for shorter periods where more current intelligence is needed as in the case of the weekly notifiable disease reports or in monthly accounts of hospitals; nevertheless, the annual figures remain the basis for analysis and interpretation, except where seasonal fluctuations occur. The question never arose whether data for six months, two years, five years, or other periods would not be more useful. The reason for accepting either the calendar year or a twelve-months period is probably that it fits in with the general practice of accounting in other fields. The year is short enough to make the results currently useful, and it is long enough to compensate for many chance fluctuations because most events we are concerned with occur sufficiently frequently during a year. The year has the further advantage that it covers a complete cycle of the seasons. In adopting annual accounting for most purposes we should not lose sight, however, of the fact that at times we need shorter periods, and sometimes longer ones as in the much needed longitudinal studies. Reference was made, for instance, in the previous chapter to the need of determining radiation exposure for a generation rather than shorter periods and similarly new methods will have to be found to express long-term experience with chronic conditions and their etiology. But health services are administered and their operation is financed on an annual basis and we need, therefore, corresponding data on their utilization. The planning of these services, as of many other social institutions including business, also emphasizes increasingly the long-term approach.

In view of the general reliance on annual data and the fact that data on the experience during a year bridge the gap between the day-based cross section and the yet unavailable truly longitudinal study, it will be useful to see how the health picture of the community appears during a twelve-months period as compared to the cross section found on a given day.

Of the 100,000 people making up this average Canadian community, a far greater percentage suffers ill health of various degrees in the course of a year:

Of the 100,000 people:

20,000 will pass the year without feeling anything wrong with them;

¹ Graunt, J., op. cit., p. 1.

80,000 will be sick or show some symptoms of illness sometime during the year;

of these:

73,000 will see a physician;

59,000 will be disabled from carrying on their usual activity sometime during the year;

16,000 will be admitted to a hospital;

780 will die;

2,530 babies will be born.

The graphic presentation of this annual picture in Figure 7 may be contrasted with that in Figure 6. Whereas on one day some 80 per cent of the people will be found seemingly well, the year-long experience is almost the reverse; 80 per cent can be expected to have some bout of illness during the year, and only 20 per cent pass the year without signs of ill health. Those found well on a given day will not be the same people throughout the year.

Here again we must be aware that of the 20 per cent of people passing through the year unscathed some will have experienced illness before that year, and all can expect illness of some form in the future.

Only one out of five in the population will have no health problem throughout the course of a year; the remaining four can be expected to face illness at varying degrees. Over the entire lifetime of a whole generation, the blank area in the chart will have disappeared completely. This illustrates what was said about one of the conceptual difficulties in measuring health: looking at Canadians on a given day and finding 86 per cent apparently healthy, we would probably not hesitate to call them a fairly healthy people. The longer we follow their experience, however, the more doubts we may have.

Also based on the Canadian Sickness Survey¹ we may expect those who are ill more likely than not to be sick more than once even during the course of one year only. Two-thirds (64 per cent) of these people will be sick twice or more, 40 per cent three times or more, and about 25 per cent four times or more.

This kind of statistic tells us only about the number of people involved. It fails to give an idea of the actual volume and impact of illness in terms of its duration. Here then is a picture of how much time during a year is taken up by illness of various types.

¹Department of National Health and Welfare, and Dominion Bureau of Statistics, *op. cit.*, p. 122.

THE HEALTH OF A POPULATION GROUP
OF 100,000 ON AN AVERAGE DAY,
CANADA, 1964

FIGURE 6

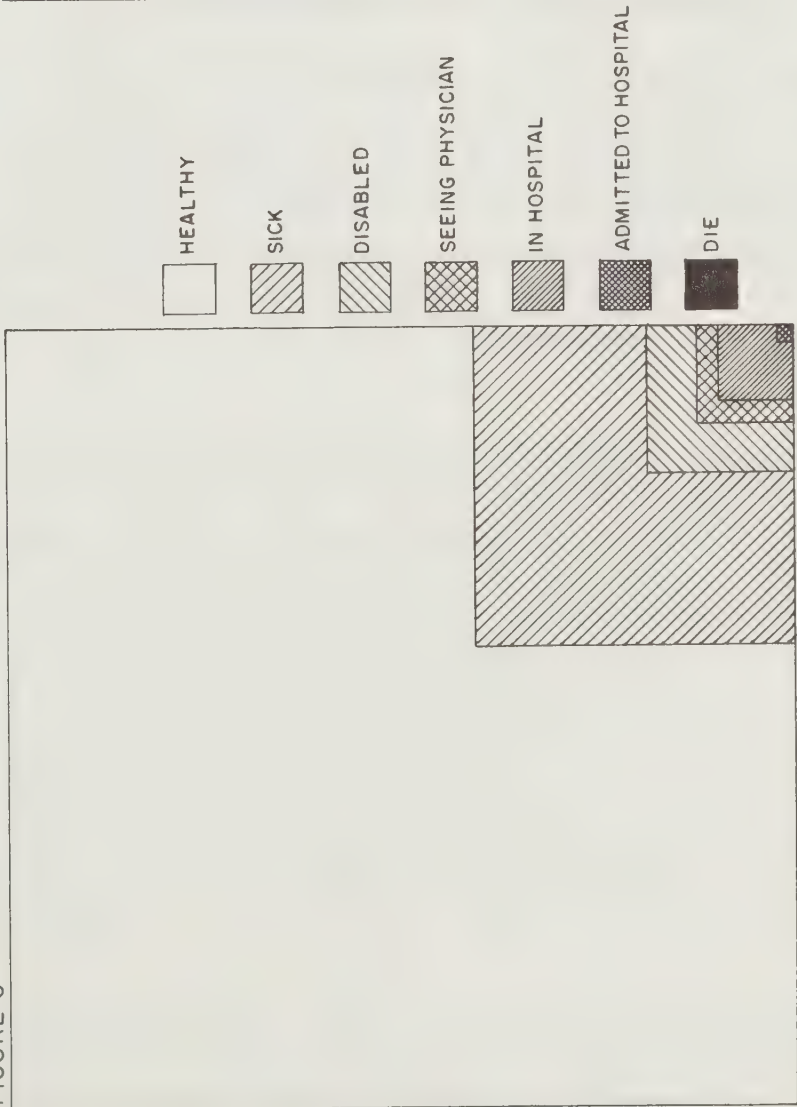
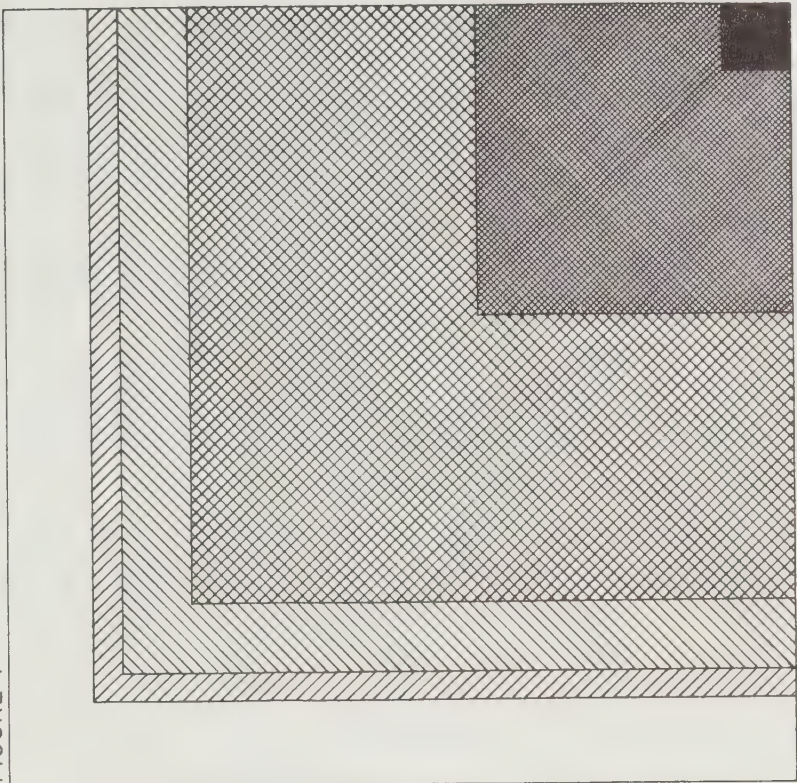


FIGURE 7



Sources: 1) Estimates of absence of illness, illness, and disability are based on the Canadian Sickness Survey 1950-51, age-sex adjusted to 1964 population.
2) Estimates of persons seeing a physician are based on the experience in the Health Insurance Plan of Greater New York, adjusted as above.
3) Estimates of hospital admissions based on reports by the Dominion Bureau of Statistics, adjusted as above.
4) Estimates of births and deaths are based on Dominion Bureau of Statistics, Annual Reports of Vital Statistics, adjusted as above.

While most people experience some illness, major or minor, during the year, the average duration of illnesses is short when related to the 365 days of the year. The Canadian Sickness Survey 1950-1951 found the average total duration of illness was 21 days; if the illness was disabling, the disability lasted for an average 10.5 days.¹ The stay in a general hospital averages 12 days.² The duration of illness of various degrees was estimated for the group of 100,000 people, representative in their age and sex composition of Canada's population in 1964. Table 10 shows the result of these estimates for various age groups and each sex. For the entire population, some 80 per cent of the year is free from illness but the picture varies considerably among the age and sex groups. Figure 8 presents graphically the distribution of the periods of health and illness as they occur in a year. The total population-days are broken down into broad age groups to indicate for each its share of the annual total of illness-free periods and times of illness. The figure shows that the eight-tenths of apparently healthy days are chiefly accounted for by the younger age groups. It shows on the other hand that all age groups have the problem of ill health and that the potential patients for the health services are more evenly distributed among the age groups than one might perhaps expect. The age groups shown in Table 10 had to be selected because of the nature of the source data; these age groups, however, differ in their width, thus rendering direct comparisons difficult.

The following tabulation was prepared in order to remove this difficulty; it shows in the columns numbered "1" the percentage of the total illness volume of the different types accounted for by each age group; columns "2" show these percentages divided by the number of years covered by each age group, so as to indicate the "per life-year" proportion of illness accounted for by population groups of various ages (arbitrarily assuming the highest age group to end at 85 for purposes of these calculations):

Percentage of Total Illness Accounted for by Various Age Groups

| Age | Illness | | Disability | | Days of Bed-fastness | | Hospitalization | | Deaths | |
|-------------------|---------|-----|------------|-----|----------------------|-----|-----------------|-----|--------|------|
| | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1 | 2 |
| | % | | % | | % | | % | | % | |
| 0 - 14 | 21.5 | 7.1 | 26.5 | 8.8 | 29.1 | 9.7 | 12.2 | 4.1 | 11.1 | 3.7 |
| 15 - 24 | 10.2 | 5.1 | 11.3 | 5.6 | 11.5 | 5.7 | 11.2 | 5.6 | 2.0 | 1.0 |
| 25 - 44 | 26.9 | 6.7 | 20.0 | 5.0 | 23.0 | 5.7 | 24.7 | 6.2 | 5.6 | 1.2 |
| 45 - 64 | 25.7 | 6.4 | 24.0 | 6.0 | 22.3 | 5.6 | 26.9 | 6.7 | 21.5 | 5.4 |
| 65 and over | 15.7 | 3.9 | 18.2 | 4.5 | 14.0 | 3.5 | 25.0 | 6.2 | 59.8 | 14.9 |
| Total | 100.0 | | 100.0 | | 100.0 | | 100.0 | | 100.0 | |

¹ Department of National Health and Welfare, and Dominion Bureau of Statistics, *Illness and Health Care in Canada, Canadian Sickness Survey 1950-1951*, Ottawa: Queen's Printer, 1960, p. 138

² Annual Report of the Minister of National Health and Welfare under the Hospital Insurance and Diagnostic Services Act, year ended March 31, 1964, p. 49.

The percentages shown in the second column under each heading make it clear that illness and its various manifestations are not confined to particular age groups, although the causes of illness vary as does their seriousness. The latter fact is reflected in the last column which indicated the relatively high impact of death in the youngest age group (infant mortality) and particularly in the 65 and over group.

Nor is there as much variation as one might expect among age groups, in the distribution within the days of illness of the various selected characteristics or manifestations:

Percentage Distribution of Days of Various Manifestations
of Illness, Compared Among Selected Age Groups

| Age | Non- disabling Illness | Disability | Bed- fastness | Hospita- lization | All Illness | Death as Per Cent of All Illness |
|-------------------|------------------------------|------------|------------------|----------------------|----------------|---|
| | % | % | % | % | % | % |
| 0 – 14 | 53.9 | 29.0 | 14.3 | 2.8 | 100.0 | 1.1 |
| 15 – 24 | 67.4 | 26.0 | 1.2 | 5.4 | 100.0 | 0.4 |
| 25 – 44 | 68.8 | 17.6 | 9.1 | 4.5 | 100.0 | 0.5 |
| 45 – 64 | 63.7 | 22.0 | 9.2 | 5.1 | 100.0 | 1.9 |
| 65 and over | 55.3 | 27.5 | 9.4 | 7.8 | 100.0 | 8.5 |

Of the selected age groups that of 15-24 years shows the lowest proportion of bedfastness and mortality loss; the relatively high percentage of hospitalization may be partly accounted for by maternity care. The low proportion, on the other hand, of hospitalization in the youngest age group does not take into account the hospital days for normal newborn care. What variation does exist, however, indicates generally the greater severity and seriousness of illness in the youngest group and more pronounced still in the oldest.

While all age groups thus contribute to the illness load of Canada’s population and while there is some similarity among the age groups in the pattern of illness, the great difference among the age groups lies in the proportion of time that illness accounts for within each age group. In other words, while each age group contributes similar amounts to the total volume of illness, these amounts come from populations that differ greatly in size. As a result, the figures in Table 10 indicate that with increasing age, more and more time is taken up by illness. These are the respective proportions:

Percentage Of Time Taken Up By Illness Within A Year

| Age Group | Per Cent of Time |
|-------------|------------------|
| 0 – 14 | 11.1 |
| 15 – 24 | 11.8 |
| 25 – 44 | 18.3 |
| 45 – 64 | 25.6 |
| 65 and over | 36.3 |
| All ages | 17.5 |

If we look more closely at what happens within each age group rather than what each contributes to the total, we obtain some idea of the differences among the various age groups and we may construct a picture of the pattern of health and ill health at successive ages. The respective percentage distribution of days of health, illness, and mortality are as follows, based again on Table 10:

Percentage of Time Taken up by Health, Illness, and Death Within One Year

| Age Group | Total Days | Health | Illness | Dis-ability | Bed-fastness | Hospita-lization | Death |
|------------------|------------|--------|---------|-------------|--------------|------------------|-------|
| | % | % | % | % | % | % | % |
| 0 - 14 | 100.0 | 88.7 | 11.1 | 3.2 | 1.6 | 0.3 | 0.2 |
| 15 - 24 | 100.0 | 88.1 | 11.8 | 3.1 | 1.4 | 0.6 | 0.1 |
| 25 - 44 | 100.0 | 81.6 | 18.3 | 3.2 | 1.7 | 0.8 | 0.1 |
| 45 - 64 | 100.0 | 73.9 | 25.6 | 5.6 | 2.4 | 1.3 | 0.5 |
| 65 and over..... | 100.0 | 60.6 | 36.3 | 10.0 | 3.4 | 2.8 | 3.1 |

The resulting picture is presented in Figure 9.

It shows, on the positive side of the ledger, how the eight-tenths of seemingly healthy days in the population as a whole fare in specific age groups. Even in the oldest group, almost two-thirds of the time are seemingly illness free. We must remember, however, the qualifications attached to this particular concept of health or freedom from illness. It not only excludes undiagnosed or unrecognized illness, it also excludes illness which a person may often not report to an interviewer either because it is considered negligible or because there is a stigma attached to it. Thus the estimates based on the Canadian Sickness Survey certainly underrate mental illness.

The main feature of illness patterns in the successive age groups is the increase in the proportion of ill time as age increases. The same applies to the selected manifestations of the severity of illness. It would be very useful to have the basic data for refining the picture presented here for broad age groups only. This would not only reveal more specifically the "healthiest" age group, but would also reveal the pattern more clearly in the remaining groups. The oldest age group, cut off again arbitrarily at 85, would no doubt show a sharp increase of illness in successive years of life within this group. The mortality rate, to be discussed later, may be taken as an indication of this. More detailed data would also lend themselves to projections revealing the health status to be expected during years which may be added to our life expectancy, indicating to what extent added years of life are also years of health. Even the rough data before us point out the general direction in which we have to move in research and services in order to improve the health status. It is the direction of stemming the tide of expanding illness with increasing age which, as the statistics reveal, reaches its peak during the so-called old age but begins much earlier in life. It should be possible to pinpoint more specifically the onset of the various health problems usually related to old age.

TABLE 10
ESTIMATED DAYS OF HEALTH, ILLNESS, DISABILITY, BEDFASTNESS, HOSPITALIZATION,
AND DEATH, PER YEAR, AMONG A GROUP OF 100,000 PEOPLE,
BY AGE AND SEX, CANADA, 1964

| Age and Sex Group | Population | Total Days in Years | Days of | | | | |
|-------------------|------------|------------------------|------------------------------------|-----------|------------|------------------|----------------------|
| | | | Health (no Illness) or Death | Illness | Disability | Bed- fastness | Hospital- ization |
| Male | | | | | | | |
| 0-4 | 6,185 | 2,258,000 | } 5,108,000 | 692,000 | 210,000 | 106,000 { | 9,000 |
| 5-14 | 11,153 | 4,071,000 | | | | | 12,000 |
| 15-24 | 7,623 | 2,782,000 | | 303,000 | 84,000 | 32,000 | 15,000 |
| 25-44 | 12,955 | 4,729,000 | | 727,000 | 150,000 | 67,000 | 33,000 |
| 45-64 | 8,907 | 3,251,000 | | 745,000 | 203,000 | 70,000 | 43,000 |
| 65-69 | 1,269 | 463,000 | } 835,300 | 444,000 | 135,000 | 57,000 { | 10,000 |
| 70 and over | 2,365 | 863,000 | | | | | 27,000 |
| Total..... | 50,457 | 18,417,000 | 15,422,700 | 2,911,000 | 782,000 | 332,000 | 149,000 |
| Female | | | | | | | |
| 0-4 | 5,915 | 2,159,000 | } 5,352,400 | 686,000 | 190,000 | 91,000 { | 7,000 |
| 5-14 | 10,647 | 3,886,000 | | | | | 10,000 |
| 15-24 | 7,477 | 2,729,000 | | 350,000 | 86,000 | 46,000 | 20,000 |
| 25-44 | 12,845 | 4,688,000 | | 993,000 | 152,000 | 89,000 | 44,000 |
| 45-64 | 8,693 | 3,173,000 | | 902,000 | 159,000 | 81,000 | 41,000 |
| 65-69 | 1,331 | 486,000 | } 847,400 | 562,000 | 142,000 | 38,000 { | 9,000 |
| 70 and over..... | 2,635 | 962,000 | | | | | 32,000 |
| Total..... | 49,543 | 18,083,000 | 14,530,600 | 3,493,000 | 729,000 | 345,000 | 163,000 |

TABLE 10 (Concluded)
ESTIMATED DAYS OF HEALTH, ILLNESS, DISABILITY, BEDFASTNESS, HOSPITALIZATION,
AND DEATH, PER YEAR, AMONG A GROUP OF 100,000 PEOPLE,
BY AGE AND SEX, CANADA, 1964

| Age and Sex Group | Population | Total Days in Years | Days of | | | | | Hospital- ization | Death |
|-----------------------------------|------------|------------------------|------------------------------------|-----------|------------|------------------|---------|----------------------|--------|
| | | | Health (no Illness) or Death | Illness | Disability | Bed- fastness | | | |
| Both Sexes | | | | | | | | | |
| 0-4 | 12,100 | 4,417,000 | 10,980,200 | 1,378,000 | 400,000 | 197,000 | 16,000 | 13,800 | |
| 5-14 | 21,800 | 7,957,000 | | | | | | 22,000 | 2,000 |
| 15-24 | 15,100 | 5,511,000 | 4,855,100 | 653,000 | 170,000 | 78,000 | 35,000 | 2,900 | |
| 25-44 | 25,800 | 9,417,000 | 7,689,000 | 1,720,000 | 302,000 | 156,000 | 77,000 | 8,000 | |
| 45-64 | 17,600 | 6,424,000 | 4,746,200 | 1,647,000 | 362,000 | 151,000 | 84,000 | 30,700 | |
| 65-69 | 2,600 | 949,000 | 1,682,700 | 1,006,000 | 277,000 | 95,000 | 19,000 | 13,400 | |
| 70 and over | 5,000 | 1,825,000 | | | | | | 59,000 | 71,900 |
| Total, All Ages, Both Sexes | 100,000 | 36,500,000 | 29,953,300 | 6,404,000 | 1,511,000 | 677,000 | 312,000 | 142,700 | |

- Notes: 1) The total days in the year were obtained by multiplying the population within the group of 100,000 by 365.
- 2) Days of health (no illness or death) are the residual left after deducting days of illness and days lost due to death.
- 3) Estimates of the days of illness, disability, and bedfastness are based on the rates from the Canadian Sickness Survey 1950-1951, age-sex adjusted for the 1964 population of Canada.
- 4) Estimates of days of hospitalization are based on the Annual Report of the Minister of National Health and Welfare under the Hospital Insurance and Diagnostic Services Act, as well as the Annual Reports by the Dominion Bureau of Statistics on Mental Health and Tuberculosis Statistics.
- 5) Death cuts short the potentially healthy life time over and above the duration of illness. The estimates of days are based on the assumption that the deaths in each age-sex group occur at mid-year so that each death means a loss of 183 days in the respective group. Basis for these estimates are the Annual Reports of Vital Statistics of the Dominion Bureau of Statistics, age-sex adjusted as above.

FIGURE 8

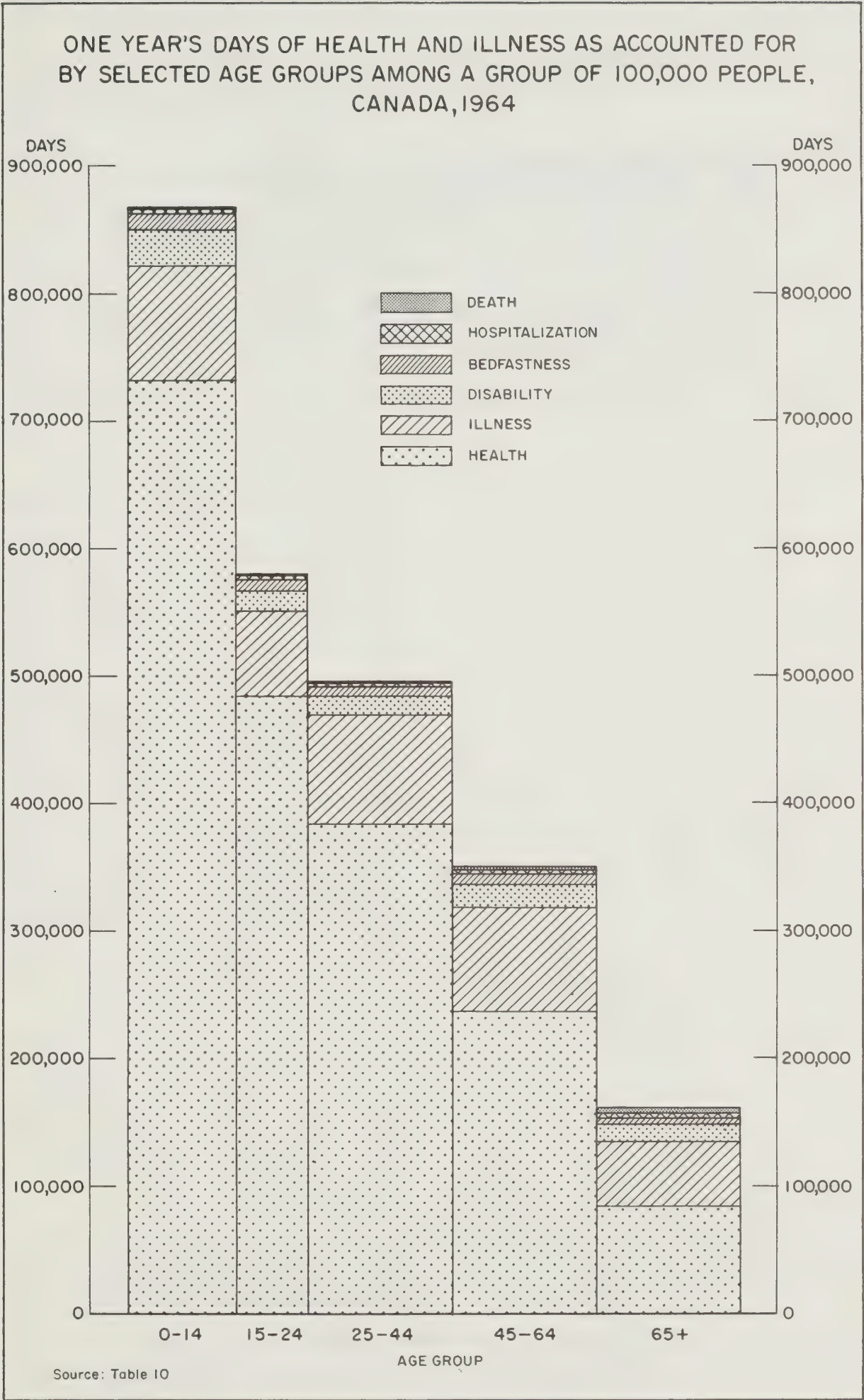
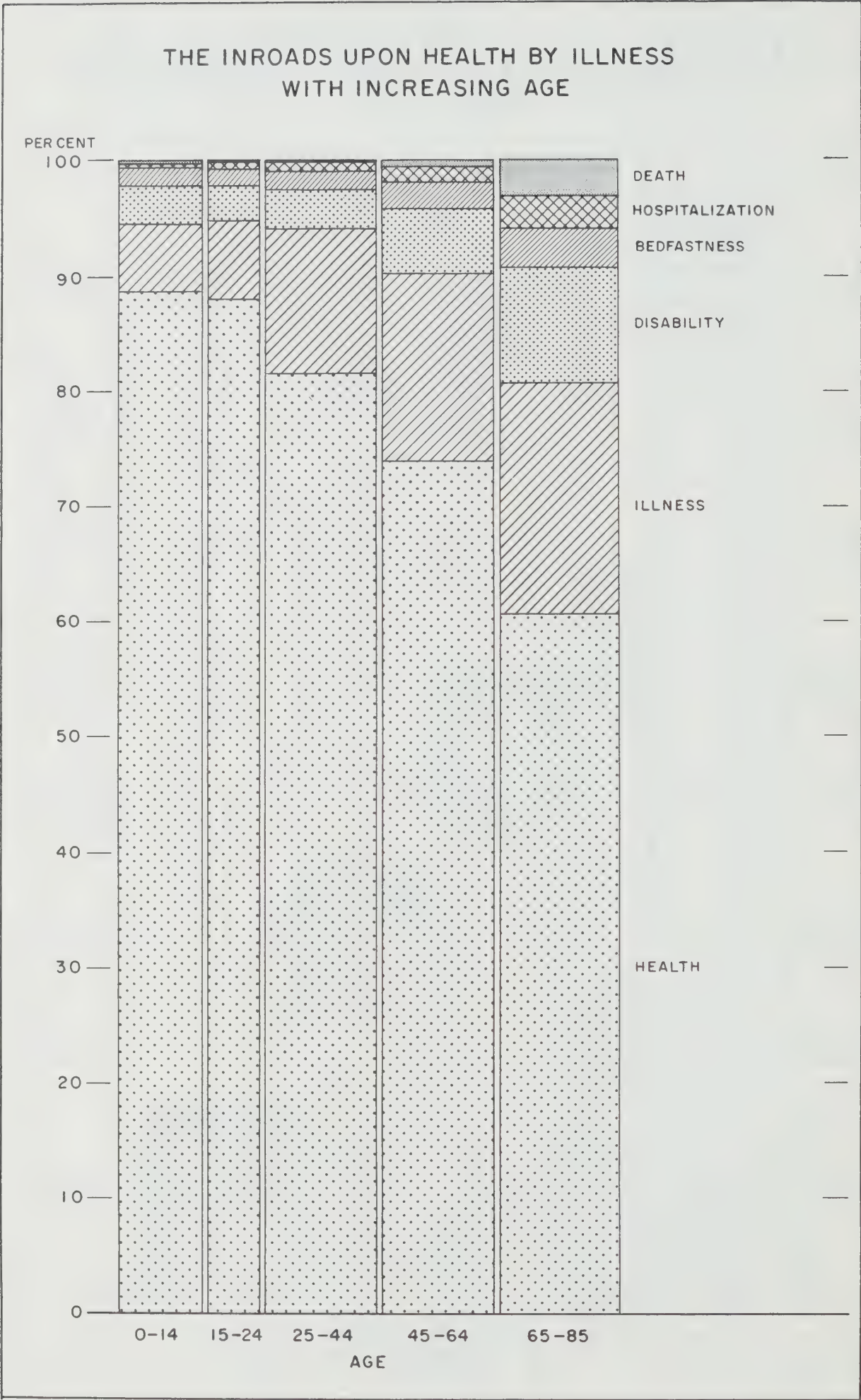


FIGURE 9



That old age is not necessarily a period of ill health is demonstrated not only by the statistics but also by the frequent newspaper reports of very fit nonagenarians and centenarians. There are in Canada several hundred people aged 100 years and over;¹ the highest age at death being recorded in recent years was 114 years, according to the Bureau of Statistics.

Certain general characteristics of illness, as established by the Canadian Sickness Survey,² are of interest.

Spells of illness last, on the average, over three weeks (24 days) until recovery, but over two per cent of these spells last a year or longer.

The average Canadian is disabled by illness for 12 days during the year. About one-quarter (24 per cent) of the people are disabled for 12 days or more in a year, and between 200,000 and 300,000 Canadians are estimated to be suffering from some permanent physical handicap which severely or totally disables them.

About half the time described as disabling is taken up by bedfastness either at home or in hospital.

This picture of the present health status of the Canadian people has been constructed, as far as illness is concerned, on the basis of the Canadian Sickness Survey 1950-1951, by applying various ratios then established to the age-sex composition of the population in 1964. This assumes no changes over the last 15 years in the general pattern of illness within any of the selected age groups shown. This assumption, which may or may not be correct, and the lack of comparable illness data for any other period make it impossible to say whether there have been any changes in the pattern of disabling and non-disabling illness or bedfastness. The only changes that become apparent from applying this method are those resulting from the changing age-sex composition of Canada's population. This alone accounts for an increase in the rate of illness and disability among the general population of about 25 per cent over the period between 1950-1951 and 1964, as follows:

| | <i>Illness Days per Person</i> | |
|-------------|--------------------------------|-------------|
| | <u>1950-1951³</u> | <u>1964</u> |
| All illness | 52 | 64 |
| Disability | 12 | 15 |
| Bedfastness | 6 | 7 |

¹ According to the Dominion Bureau of Statistics, the 1961 Census showed 549 persons aged 99 and over. Census officials caution, however, against accepting this figure at its face value because of likely errors due to the memory factor, lacking documentation, etc.

² Department of National Health and Welfare, and Dominion Bureau of Statistics, op. cit., passim.

³ Department of National Health and Welfare, and Dominion Bureau of Statistics, op. cit., p. 115.

Thus, while we do not know whether the force of illness has changed, the changing composition of the population alone has brought an increase in the averages. This has its effect on the demand for health services even without taking into account the numerical increase of the population.

Hospitalization rates do not lend themselves as indicators of health trends, particularly during the last decade, because they reflect not only changes in the volume of illness but also the physical and financial availability of services, admission practices, changing treatment methods, the existence of alternative facilities and services, and other factors extraneous to health and illness as such.

Once we obtain reliable and current data on illness, it will be possible to use them as the basis for developing indices of illness and of its absence.¹ At some time in the future it will no doubt become possible also to measure the positive aspects of health and thus prepare indicators of health rather than illness.

In the meantime, if we want to examine historic trends, or make comparisons with other countries, we cannot do it for health or illness, but have to limit ourselves to the only aspects for which valid measurements have been available for a period of time, namely the facts of life and death. This leads to the review of mortality statistics and statistics derived from them, such as life table data.

Life and Death

In resorting to mortality data as indices of health conditions, we must remember that life and death are not synonymous with health and illness, and that in fact, these two pairs of phenomena may show divergent trends as has been pointed out before: added years of life may well be years of reduced health. But fatality still remains the most severe consequence of illness and the resulting statistics are good indicators of mortality because death is a clearly defined event and also because of the completeness of vital statistics which are based on the system of legally required registration.

Traditionally and even at our present stage of knowledge, lower mortality has generally been regarded as an indication of better health. This is justifiable by and large; though mortality data do not tell the whole health story, declining mortality means a reduction in the final and most severe consequence of ill health. It is true that where we succeed today in prolonging the life of many patients without always curing their disease, we do not achieve health as such, but postponing mortality is no doubt an improvement in itself. "Where there is life, there is hope": once we have extended life there is always the possibility, or hope, of a cure or of arresting the disease process. Similarly we can speak of improving health if we succeed, for instance, by rehabilitation procedures to

¹ As, for instance, in Chiang, C.L., "An Index of Health; Mathematical Methods", Vital and Health Statistics, Data Evolution and Methods Research, National Center for Health Statistics, Series 2, Number 2, Washington, U.S. Department of Health, Education, and Welfare, 1965.

change a disabling to a non-disabling or less disabling condition. Reduced mortality then may not necessarily mean health but it is at least the first step towards better health.

General Mortality Trends in Canada, 1931 – 1963

“General” mortality refers to mortality from all causes.¹ Four different, though related, measures of general mortality in Canada for the period from 1931 to 1963 are presented in Table 11.

All four of these measures have their particular application. This is true also of the ones shown in the first two columns of Table 11 which are too often neglected in favour of some of the more sophisticated and refined statistical gauges of mortality.

The *number of deaths* (col. 1) in a given year will be influenced not only by health conditions but very largely also by the size of the population. It does, therefore, not permit conclusions regarding health conditions, except perhaps in the case of epidemics of fatal diseases where even a count of the deaths occurring from day to day can give valuable insight into the course of such an epidemic. The growth in the number of deaths occurring annually in Canada by about 40,000 since 1931, as well as the most recent annual increases of several thousand, are the direct result of the greater number of fatal diseases and accidents with a correspondingly greater demand on the health services to care for those conditions. This may serve as a reminder that even under improving health conditions the demand for services must be expected to rise as the population increases.

The *crude death rate* (col. 2) expresses the number of deaths in terms of 1,000 of the population. It thus eliminates the effects of numerical changes in the population. According to this measure, mortality in Canada has improved by about 25 per cent since 1931, despite the growing absolute number of deaths. Mortality varies considerably, however, among various age and sex groups of the population and to the extent that these characteristics change, the crude rate will not give a true picture of the force of mortality. Again, as an indicator of the demand for health services, the crude rate is useful in telling the health worker what to expect in a population of a given size if its age composition is similar to that of the total population. Because it is influenced by the proportion of older people, it must be expected to level off and even to rise in a population that is aging because better health keeps people alive longer. This rate is useful for

¹ Unless otherwise indicated, the computation of morbidity and mortality rates in this study follows the practice of the vital statistics of the Dominion Bureau of Statistics, i.e.:

| | |
|--|--------------------------|
| General death rates (deaths from all causes together) | per 1,000 population, |
| but infant, neonatal and perinatal rates | per 1,000 live births, |
| maternal death rate | per 10,000 live births, |
| rates for causes of death | per 100,000 population, |
| but for infant, neonatal, and maternal deaths | per 100,000 live births, |
| incidence and prevalence of morbidity are generally expressed in relation to | 100,000 population. |

observations over a short period of time when the composition of the population is unlikely to change very much, and it is also helpful in comparisons with other countries where more refined indicators are not always available.

TABLE 11
MORTALITY IN CANADA, 1931 – 1963

| Year | (1) Number of Deaths ¹ | (2) Crude Death Rate ¹ | (3) Standardized Death Rate ¹ | (4) Age-proportional Death Rate ² |
|-----------|---|---|--|--|
| 1931..... | 108,446 | 10.2 | 12.2 | 20.8 |
| 1932..... | 108,161 | 10.0 | 12.1 | 20.3 |
| 1933..... | 105,603 | 9.7 | 11.6 | 19.4 |
| 1934..... | 105,277 | 9.5 | 11.4 | 18.9 |
| 1935..... | 109,724 | 9.9 | 11.6 | 19.2 |
| 1936..... | 111,111 | 9.9 | 11.5 | 20.3 |
| 1937..... | 118,019 | 10.4 | 12.1 | 20.4 |
| 1938..... | 110,647 | 9.7 | 11.1 | 18.3 |
| 1939..... | 112,729 | 9.7 | 11.1 | 18.4 |
| 1940..... | 114,717 | 9.8 | 11.0 | 18.2 |
| 1941..... | 118,797 | 10.1 | 11.2 | 18.6 |
| 1942..... | 117,110 | 9.8 | 10.7 | 17.7 |
| 1943..... | 122,640 | 10.1 | 11.0 | 18.3 |
| 1944..... | 120,393 | 9.8 | 10.5 | 17.4 |
| 1945..... | 117,325 | 9.5 | 9.3 | 16.4 |
| 1946..... | 118,785 | 9.4 | 9.9 | 16.2 |
| 1947..... | 121,503 | 9.4 | 9.7 | 15.7 |
| 1948..... | 122,974 | 9.3 | 9.5 | 15.2 |
| 1949..... | 124,567 | 9.3 | 9.4 | 14.9 |
| 1950..... | 124,220 | 9.1 | 9.1 | 14.5 |
| 1951..... | 125,823 | 9.0 | 9.0 | 14.3 |
| 1952..... | 126,385 | 8.7 | 8.8 | 13.9 |
| 1953..... | 127,791 | 8.6 | 8.6 | 13.7 |
| 1954..... | 124,855 | 8.2 | 8.2 | 13.0 |
| 1955..... | 128,476 | 8.2 | 8.2 | 13.0 |
| 1956..... | 131,961 | 8.2 | 8.2 | 13.4 |
| 1957..... | 136,579 | 8.2 | 8.3 | 13.0 |
| 1958..... | 135,201 | 7.9 | 8.0 | 12.7 |
| 1959..... | 139,913 | 8.0 | 8.1 | 12.8 |
| 1960..... | 139,693 | 7.8 | 7.9 | 12.6 |
| 1961..... | 140,985 | 7.7 | 7.6 | 11.8 |
| 1962..... | 143,699 | 7.7 | 7.6 | 11.7 |
| 1963..... | 147,367 | 7.8 | 7.6 | 11.6 |

¹ Dominion Bureau of Statistics, Vital Statistics 1963, Ottawa: Queen's Printer, 1965, pp. 94 and 106.
² Calculations based on the above; for methods, see: Kohn, R., "An Objective Mortality Indicator", Canadian Journal of Public Health, Vol. 42, September 1951, pp. 375-379.

The *standardized death rate* (col. 3) is adjusted to a population of constant age-sex composition¹ and thus eliminates the effect of changes in this composition. Because it is not affected by the aging of the population it shows a sharper decline (38 per cent since 1931) than the crude death rate.

The *age-proportional death rate* (col. 4) is calculated by weighting the age-specific death rates according to the reciprocal of the age to which they apply. This eliminates the need for referring to any particular age distribution of the population and reflects in a general way the decreasing social impact of death with the increasing age at which it occurs.² By this measure, mortality has declined by 44 per cent between 1931 and 1963, and continues to decline even when the crude and standardized rates level off.

The decline in the mortality rates, indicative of an improvement in health conditions, has thus been accompanied by an increase in the actual number of deaths, which must be expected in a growing population and which implies an increasing demand on health services. The demand for services due to terminal illness is being reinforced by the growing proportion of deaths occurring in hospitals. This proportion has doubled since the early 1930's, and in the last ten years alone has risen from 51.4 per cent in 1953 to 64.9 per cent in 1963.³

Canada is in the fortunate position of not having to worry about the demographic implication of a declining death rate which in many other countries adds to an already existing population pressure. An illustration of the effect of Canada's declining mortality rate on the size of its population is presented in Table 12; it shows that in 1961 the population would have been smaller by about one million, had the 1926 death rate of 11.4 prevailed ever since.

¹ In this case the population of Canada in 1956, a Census Year and also the mid-year between two decennial revisions of the International Classification of Diseases.

² If it can be accepted that an individual's function in society culminates when he reaches the peak of his career and has raised his children, then it can be assumed that his inevitable death will be less disrupting and he will be more resigned to it the later in life it occurs. This method oversimplifies the relative impact of death among age groups, particularly the younger ones (a death at age 100 has one-hundredth of the weight of a death at age one); but of the deaths in Canada in 1963, about 78 per cent occurred at ages 50 and over, and 81 per cent at ages 45 and over (see also: Kohn, R., "An Objective Mortality Indicator", Canadian Journal of Public Health, Sept. 1951, pp. 375-379). Two possible adaptations both simplified but each with its own advantages and disadvantages may be illustrated here:

(a) if the actual population composition is to be taken into account, one may weight the actual number of deaths instead of the rate, and obtain the over-all rate by dividing the total of the age-weighted deaths by the population. The result would be like this for Canada, selected years:

| | 1931 | 1961 | 1962 | 1963 |
|------|-------|------|------|------|
| Rate | 117.5 | 44.7 | 44.2 | 42.3 |

(b) if the age-specific and age-weighted death rates were simply averaged, the following would be the result for the same years:

| | | | | |
|------|------|------|------|------|
| Rate | 1.00 | 0.47 | 0.46 | 0.46 |
|------|------|------|------|------|

³ Dominion Bureau of Statistics, Vital Statistics 1963, Ottawa: Queen's Printer, 1965, p. 97.

TABLE 12

POPULATION OF CANADA, 1961, IF 1926 DEATH RATE HAD PREVAILED
(thousands)

| Year | (1) Population (from col. 7, previous line) | (2) Birth Rate (per 1,000 population) | (3) Computed Number of Births (1) x (2) 1,000 | (4) Net Migration | (5) Total (1) ÷ (3)÷(4) | (6) Computed Number of Deaths (1) x 11.4 1,000 | (7) Hypothetical Population (5) - (6) |
|--|--|---|--|-------------------------|----------------------------------|---|--|
| 1926..... | 9,717 | 24.7 | 240 | 29 | 9,986 | 111 | 9,875 |
| 1927..... | 9,875 | 24.3 | 240 | 55 | 10,170 | 113 | 10,057 |
| 1928..... | 10,057 | 24.1 | 242 | 69 | 10,368 | 115 | 10,253 |
| 1929..... | 10,253 | 23.5 | 241 | 72 | 10,566 | 117 | 10,449 |
| 1930..... | 10,449 | 23.9 | 250 | 47 | 10,746 | 119 | 10,627 |
| 1931..... | 10,627 | 23.2 | 247 | 35 | 10,909 | 121 | 10,788 |
| 1932..... | 10,788 | 22.5 | 243 | 1 | 11,032 | 123 | 10,909 |
| 1933..... | 10,909 | 21.0 | 229 | 1 | 11,139 | 124 | 11,015 |
| 1934..... | 11,015 | 20.7 | 228 | -13 | 11,230 | 126 | 11,104 |
| 1935..... | 11,104 | 20.5 | 228 | -13 | 11,319 | 127 | 11,192 |
| 1936..... | 11,192 | 20.3 | 227 | -10 | 11,409 | 128 | 11,281 |
| 1937..... | 11,281 | 20.1 | 227 | -13 | 11,495 | 129 | 11,366 |
| 1938..... | 11,366 | 20.7 | 235 | -17 | 11,584 | 130 | 11,454 |
| 1939..... | 11,454 | 20.6 | 236 | - 8 | 11,682 | 131 | 11,551 |
| 1940..... | 11,551 | 21.6 | 249 | -21 | 11,779 | 132 | 11,647 |
| 1941..... | 11,647 | 22.4 | 261 | -17 | 11,891 | 133 | 11,758 |
| 1942..... | 11,758 | 23.5 | 276 | -12 | 12,022 | 134 | 11,888 |
| 1943..... | 11,888 | 24.2 | 288 | -24 | 12,152 | 136 | 12,016 |
| 1944..... | 12,016 | 24.0 | 288 | -20 | 12,284 | 137 | 12,147 |
| 1945..... | 12,147 | 24.3 | 295 | -51 | 12,391 | 138 | 12,253 |
| 1946..... | 12,253 | 27.2 | 333 | 3 | 12,589 | 140 | 12,449 |
| 1947..... | 12,449 | 28.9 | 360 | 15 | 12,824 | 142 | 12,682 |
| 1948..... | 12,682 | 27.3 | 346 | 42 | 13,070 | 145 | 12,925 |
| 1949..... | 12,925 | 27.3 | 353 | 37 | 13,315 | 147 | 13,168 |
| 1950..... | 13,168 | 27.1 | 357 | 17 | 13,542 | 150 | 13,392 |
| 1951..... | 13,392 | 27.2 | 364 | 42 | 13,798 | 153 | 13,645 |
| 1952..... | 13,645 | 27.9 | 381 | 173 | 14,199 | 156 | 14,043 |
| 1953..... | 14,043 | 28.1 | 395 | 96 | 14,534 | 160 | 14,374 |
| 1954..... | 14,374 | 28.5 | 410 | 131 | 14,915 | 164 | 14,751 |
| 1955..... | 14,751 | 28.2 | 416 | 97 | 15,264 | 168 | 15,096 |
| 1956..... | 15,096 | 28.0 | 423 | 64 | 15,583 | 172 | 15,411 |
| 1957..... | 15,411 | 28.3 | 436 | 196 | 16,043 | 176 | 15,867 |
| 1958..... | 15,867 | 27.6 | 438 | 135 | 16,440 | 181 | 16,259 |
| 1959..... | 16,259 | 27.5 | 447 | 64 | 16,770 | 185 | 16,585 |
| 1960..... | 16,585 | 26.9 | 446 | 48 | 17,079 | 189 | 16,890 |
| 1961..... | 16,890 | 26.1 | 441 | 33 | 17,364 | 193 | 17,171 |
| Actual population, 1961 | | | | | 18,238,000 | | |
| Hypothetical population, 1961 (col. 7) | | | | | 17,171,000 | | |
| Increase due to mortality decline | | | | | 1,067,000 | | |

Source: Based on Dominion Bureau of Statistics, Annual Vital Statistics and Canada Year Book,
Ottawa: Queen's Printer.

Age, Sex, and Regional Differences in Mortality

The reduction in mortality has not been evenly distributed among the various age and sex groups of the population. Table 13 and Figure 10 compare the age-specific death rates for both sexes in the period 1931–1935 (average), the years 1953, and 1963:¹

TABLE 13
AGE-SPECIFIC DEATH RATES, CANADA, 1931–1935, 1953, AND 1963

| Age | 1931–1935 | 1953 | 1963 |
|----------------------------|-----------|-------|-------|
| Under 1 ¹ | 74.9 | 35.6 | 26.3 |
| 1–4 | 5.6 | 1.8 | 1.1 |
| 5–9 | 1.7 | 0.8 | 0.6 |
| 10–14 | 1.4 | 0.6 | 0.4 |
| 15–19 | 2.1 | 1.0 | 0.8 |
| 20–24 | 2.8 | 1.4 | 1.2 |
| 25–29 | 3.2 | 1.2 | 1.1 |
| 30–34 | 3.6 | 1.6 | 1.2 |
| 35–39 | 4.3 | 2.2 | 1.8 |
| 40–44 | 5.1 | 3.4 | 2.7 |
| 45–49 | 6.8 | 5.2 | 4.5 |
| 50–54 | 9.7 | 8.5 | 7.3 |
| 55–59 | 14.2 | 12.7 | 11.7 |
| 60–64 | 22.2 | 19.9 | 18.7 |
| 65–69 | 33.6 | 30.0 | 28.1 |
| 70–74 | 53.6 | 46.8 | 43.7 |
| 75–79 | 85.8 | 75.5 | 69.8 |
| 80–84 | 139.8 | 119.5 | 113.5 |
| 85 and over | 225.2 | 214.7 | 202.7 |
| All ages | 9.8 | 8.6 | 7.8 |

¹ Rate per 1,000 live births.

Two things become obvious from the chart. First, the childhood and young adult ages are the ones that have most profited from the long-term trend of mortality in the various age groups. Second, the short-term trend (between 1953 and 1963) moves by and large in the same direction, improving but little the situation in later adulthood and old age.

There is, however, a noticeable difference between the mortality experience of males and females at various ages. In all age groups, the female rates are lower, and this applies particularly also to the oldest groups:²

¹ Dominion Bureau of Statistics, *Vital Statistics 1963*, op. cit., pp. 100 and 101.

² Based on Dominion Bureau of Statistics, *Vital Statistics 1963*, op. cit., p. 20.

Age-Specific Death Rates, by Sex, Canada, 1963

| Age | Rate | | Per Cent Difference |
|-----------------------|------|--------|---------------------|
| | Male | Female | |
| -1 ¹ | 29.6 | 22.2 | 25 |
| 1-4..... | 1.2 | 0.9 | 25 |
| 5-9..... | 0.7 | 0.4 | 43 |
| 10-14..... | 0.5 | 0.3 | 40 |
| 15-19..... | 1.1 | 0.6 | 45 |
| 20-29..... | 1.7 | 0.7 | 59 |
| 30-39..... | 1.9 | 1.1 | 42 |
| 40-49..... | 4.5 | 2.7 | 40 |
| 50-59..... | 12.1 | 6.4 | 47 |
| 60-69..... | 29.3 | 16.7 | 43 |
| 70 plus..... | 88.7 | 69.6 | 22 |
| All ages..... | 9.0 | 6.6 | 27 |

¹ Rate per 1,000 live births.

For all ages taken together, the mortality rate of females is about one-quarter below the male rate. It is of this order of magnitude in the extreme age groups which account for the largest number of deaths. In the middle age groups, however, the female rates are from about 40 to 60 per cent below the male rates.

This ever widening gap is the result of the historic trend which shows a faster decline in the female rates than the male:¹

Per Cent Decline From the Average Rates 1926-1930 to the Rates in 1963

| Age | Male | Female |
|-----------------------|-----------|-----------|
| -1 ¹ | % 71.3 | % 72.4 |
| 1-4..... | 85.6 | 87.8 |
| 5-9..... | 75.0 | 80.2 |
| 10-14..... | 73.8 | 84.3 |
| 15-19..... | 61.9 | 80.1 |
| 20-29..... | 55.1 | 83.5 |
| 30-39..... | 54.4 | 77.2 |
| 40-49..... | 33.4 | 60.0 |
| 50-59..... | 6.3 | 44.0 |
| 60-69..... | 3.4 | 37.1 |
| 70 plus..... | 7.5 | 24.6 |

¹ Rate per 1,000 live births.

The previously observed relatively small gains in the older age groups show remarkable differences between the sexes. The much greater reduction in the mortality among older women would appear to disprove the contention that but little progress has been made, and can be made with present knowledge, in the mortality among older people.

¹ Dominion Bureau of Statistics, Vital Statistics 1963, op. cit., p. 20.

FIGURE — 10

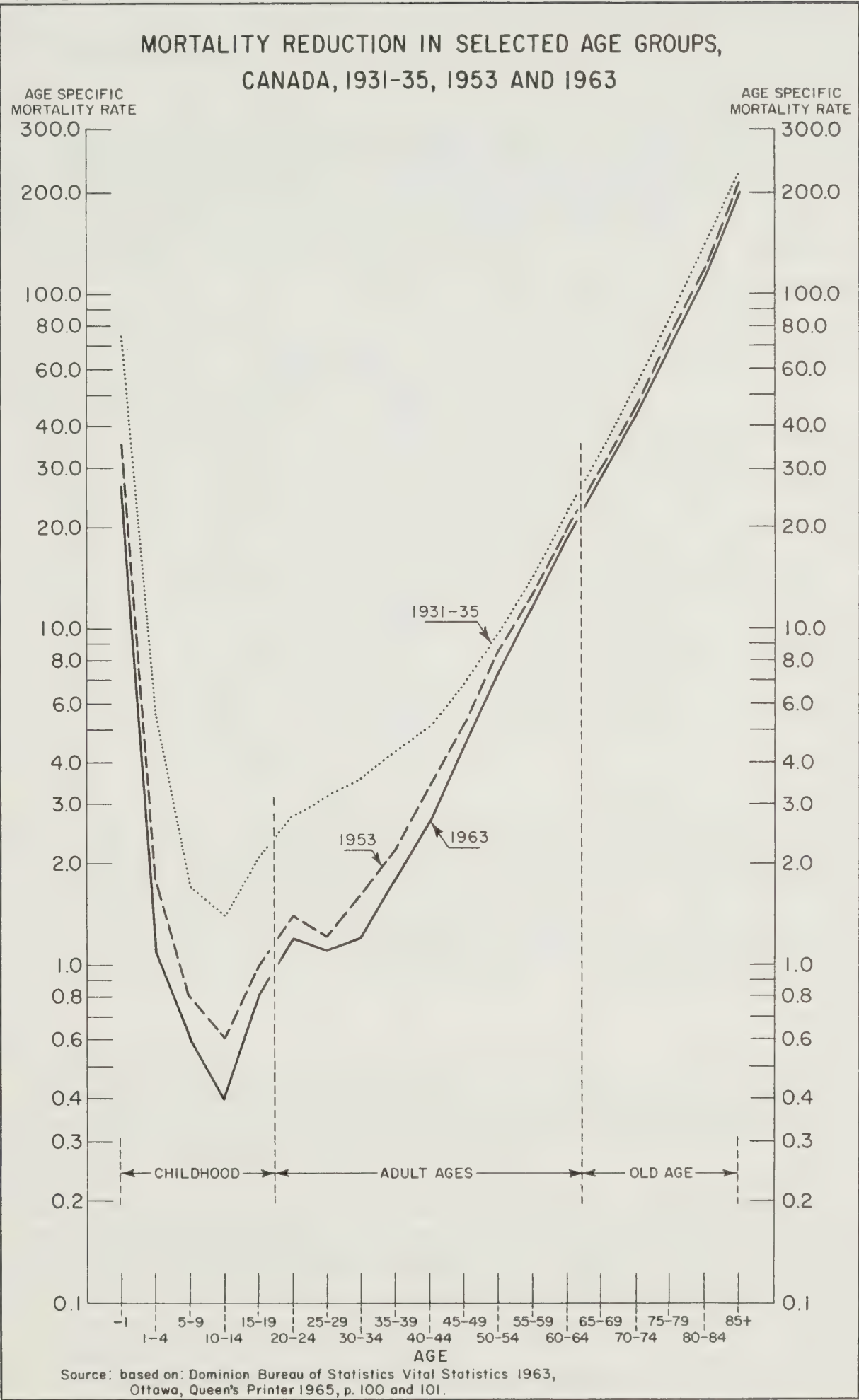


Figure 10 shows clearly the considerable impact mortality exerts during the first year of life, its rapid abatement after that during childhood, its low force in adolescence and young adult ages when the rates begin to climb gradually until they reach their peak in old age.

While the infant mortality rate in Canada has dropped to about one-third over the last thirty years, it is still high when compared with that of other countries as will be shown later. It varies considerably among the various parts of Canada and it accounts in part for the variation in the mortality rates among the provinces and territories. The general death rates and the infant mortality rates stood as follows in the various parts of Canada in 1963:¹

| Province, Territory | Death Rate | | Infant Mortality Rate |
|-----------------------------|------------|--------------|-----------------------|
| | Crude | Standardized | |
| Newfoundland | 6.6 | 7.7 | 38.3 |
| Prince Edward Island | 9.1 | 7.0 | 21.4 |
| Nova Scotia | 8.4 | 7.4 | 27.0 |
| New Brunswick | 7.8 | 7.5 | 27.6 |
| Quebec | 7.0 | 8.2 | 30.0 |
| Ontario | 8.3 | 7.7 | 22.8 |
| Manitoba | 8.3 | 7.2 | 24.7 |
| Saskatchewan | 8.0 | 6.7 | 27.1 |
| Alberta | 6.7 | 7.0 | 23.6 |
| British Columbia | 8.9 | 7.0 | 23.5 |
| Yukon | 5.4 | 6.8 | 32.1 |
| Northwest Territories | 11.1 | 11.9 | 104.2 |
| Canada | 7.8 | 7.6 | 26.3 |

The differences observed in the crude rates are reduced to some extent when allowance is made for the varying age-sex composition of the populations. The foregoing tabulation shows to what extent high general mortality rates are associated with high infant mortality rates.

Health at Birth

In the discussion of births as a determinant of population size and growth reference was made to the fact that the birth rate and fertility are largely the result of social and demographic factors, and only indirectly affected by health conditions.

There are, however, certain conditions which may be present at birth or result from it, and which may affect the individual's health during his life at varying degree. Some of these will be reviewed later in connection with diseases of early infancy and congenital malformations.

¹ Dominion Bureau of Statistics, *Vital Statistics 1963*, op. cit., pp. 14, 94, 106.

Indicative of the health of the foetus is the stillbirth rate.¹ This rate averaged 30.1 for Canada in the period from 1931 to 1935; it had been reduced to 16.7 by 1953; and reached a new low of 12.3 in 1963.² The leading cause is "Placental and Cord Condition".³ Stillbirths are now considered as one phase of mortality occurring immediately before, during, or immediately after birth and we find them, therefore, combined with infant deaths under one week as perinatal deaths. The perinatal death rate in Canada has declined from an average of 55.2 for the period 1931 to 1935, to 33.1 in 1953, and 28.0 in 1963.

Immaturity appears as one of the major causes of infant deaths; it accounts for about 20 per cent of them, but for 28 per cent of all neonatal deaths, i.e., deaths occurring within the first four weeks of life. The latter actually constitute 69 per cent of the infant deaths, indicating that the problem of infant mortality is found mainly in the very early stages of life.

The extent and some of the characteristics of immaturity among babies born in Canada can be measured by data regarding the birth weight and related factors on the birth certificates (except in Newfoundland).⁴ In 1963, 7.0 per cent of all male infants born alive weighed 5½ pounds or less, the percentage ranging from 8.5 per cent in Quebec to 5.4 per cent in Prince Edward Island. Of the female infants, 8.3 per cent weighed 5½ pounds or less, and the percentage in the provinces ranged from 9.9 per cent in Quebec to 6.4 per cent in Prince Edward Island. The vital statistics reports also relate birth-weight to the age of mother, and indicate the chances of delivering an immature baby to be lowest for mothers aged 25–29; when related to the period of gestation, immaturity in terms of weight is found in almost all live births delivered under 28 weeks gestation, while only 2.5 per cent of those delivered at full term were immature.⁵

The number of births – 465,767 live births and 5,732 stillbirths in Canada in 1963 – constitutes an important factor in the demand for health services, a factor which is bound to increase with the increasing population unless there is a very drastic drop in the birth rate.

Almost all births now occur in hospital: the percentage has increased from 83.4 in 1953 to 98.3 in 1963, and was over 99 per cent in six of the provinces in that year.

Life Span

The length of the average life span of Canadians is the direct result of the outlined trends in mortality. The changing pattern of the death rates brings about corresponding changes in the length of life.

¹ Stillbirths being a foetal death of 28 or more weeks' gestation, and stillbirths rate the number of stillbirths per 1,000 live births.

² Dominion Bureau of Statistics, *Vital Statistics 1963*, op. cit., p. 89.

³ *Ibid.*, p. 90.

⁴ The World Health Organization defines as "immature" infants weighing not more than 5½ pounds, or approximately 2,500 grams, at birth.

⁵ Dominion Bureau of Statistics, *Vital Statistics 1963*, op. cit., p. 17.

The life span is regarded as one of the most useful indicators for the evaluation of health conditions in a population, and in fact of social conditions generally.

There are several measures available to determine how long Canadians live: the average (mean) age at death, the median age at death, and the life expectancy. Parts or variations of the latter are life expectancy values at various ages and school or working life expectancy, but in dealing with the question of the over-all length of life we refer to life expectancy at birth as it appears in life tables.¹ Mortality statistics and life table values provide data on life years lost which are based on the assumption that each death occurring before the limit of life expectancy at birth constitutes a loss corresponding to the difference in years, or a death at any age represents a loss corresponding to the life expectancy at that age. Similarly calculated are losses of working life, the limit here being the usual retirement age. As is the case with the several types of mortality rates previously discussed, each of the various measures of the length of life emphasize different aspects of survival and death.

The average (or mean) and median age at death² indicate the length of life of those dying during the current year. These are people who lived their lives under health conditions existing in the past. They did not benefit fully from recent advances in medical care. The life expectancy at birth, on the other hand, tells us what the life pattern is likely to be for babies born today if the current mortality experience were to prevail throughout their life time. Their actual life span will be different from today's life table values; if mortality continues to be reduced, they will be exposed to those changed conditions throughout the coming decades of their lives.

For the middle aged, the actual expectancy will be somewhere between that of the people who are dying and of those born today. Thus, the mean age at death of Canadians today is about 60 years; one might expect then that this would have been the life expectancy at birth 60 years ago but actually it was then less than 50 years.³

¹ The basic concept underlying the construction of life tables is to follow the experience of a cohort of people and has been applied in other fields such as in studies of institutional life expectancy.

² Tables showing the median age at death are a recent and valuable addition to the annual reports of vital statistics by the Dominion Bureau of Statistics. In discussing the average (i.e., mean) and median age, the Bureau points out that the high mortality in infancy and the young ages tends to reduce the mean age whereas the median age is more indicative of the absolute number of deaths. The median as a measure of central tendency is less affected than the mean by extreme values. Which of the two measures gives a better picture of the age distribution of deaths will depend on the purpose in each case; both have their usefulness. For some purposes one would want the high mortality early in life reflected in the average as an important feature of the existing mortality pattern because it would reflect frequencies of events rather than volume as would be the case, for instance, on determining median income.

³ Lacking Canadian figures for the period around 1900, this figure is taken from the U.S. life tables which generally are fairly close to Canadian experience.

The following tabulation shows for selected years the mean and median age at death, that is the average length of life of the people dying in each year. The widening gap between the sexes is as noticeable as it is in the mortality rates.

Age at Death, Canada, 1933–1963¹

| Year | Mean | | Median | |
|------------|------|--------|--------|--------|
| | Male | Female | Male | Female |
| 1933 | 47.1 | 48.9 | n.a. | n.a. |
| 1943 | 52.7 | 54.5 | n.a. | n.a. |
| 1953 | 56.4 | 59.3 | 65.7 | 69.3 |
| 1963 | 60.5 | 64.1 | 68.2 | 72.9 |

The figures are not adjusted to the age structure of the population and it is therefore difficult to say how much of the increase is due to improved health and living conditions, and how much is the result of the changing age composition. For example, the increase in the mean age at death in the nineteen thirties is partly due to the unusual increase of the proportion of people over 50 in the population which, in turn, is partly due to the lower birth rate and the net emigration during that decade. On the other hand, the increase in the mean age at death during the nineteen fifties occurred despite a slightly reduced proportion in the over 50 group. The fact remains, however, that Canadians reaching the end of their lives today have on the average lived about 15 years longer than their forbears who died 30 years ago.

To illustrate the implications of this extension of the life span, we may look at its effect upon the economically productive life. Assuming that it begins, roughly speaking, at age 15, men dying in 1933 would have spent a working life of about 32 years, women of about 34 years. In 1963, the corresponding working life figures were 46 for men and 49 for women, an increase of more than 40 per cent over the 30-year period. It must be noted, however, that this is the potential, and not the actual working life span. The latter would be shorter due to the amount of disability usually preceding death.

Life tables indicate the life expectancy at various ages, based on the probability of dying or surviving at a given age, this probability being computed from the current mortality pattern. With this pattern prevailing from the time of birth, the life expectancy at birth gives the expected total life span. As a result of the improvement over the years in the mortality of Canadians, their life expectancy has been increasing steadily. This increase, however, like the underlying decrease in mortality, is not evenly distributed among the age group and the sexes as shown below:²

¹ Dominion Bureau of Statistics, *Vital Statistics 1963*, Ottawa: Queen's Printer, 1965, pp. 98, 99.
² Dominion Bureau of Statistics, *Vital Statistics 1963*, op. cit., p. 212.

Expectation of Life at Selected Ages, Canada, 1931 – 1961

| Age | 1931 | 1941 | 1951 | 1956 | 1961 |
|---------------|-------|-------|-------|-------|-------|
| Male | | | | | |
| At birth..... | 60.0 | 62.96 | 66.33 | 67.61 | 68.35 |
| 50 | 23.72 | 23.49 | 23.88 | 24.04 | 24.25 |
| 100 | 1.53 | 1.46 | 1.60 | 1.52 | 1.49 |
| Female | | | | | |
| At birth..... | 62.10 | 66.30 | 70.83 | 72.92 | 74.17 |
| 50 | 24.79 | 25.46 | 26.80 | 27.65 | 28.33 |
| 100 | 1.77 | 1.64 | 1.59 | 2.05 | 1.56 |

The respective percentage increases show how the gains decline with increasing age:

Percentage Gain in Life Expectancy at Selected Ages, Canada, 1931 – 1961

| Age ¹ | Male | Female |
|------------------|------|--------|
| | % | % |
| At birth..... | 13.9 | 19.4 |
| 50 | 2.2 | 14.3 |

Due to the high mortality during the first year of life, the life expectancy at age one has always been higher than that at birth but this gap has been narrowing and amounted to only about one per cent for males and less for females.

The more rapid gain in the life expectancy of females – resulting from the corresponding mortality pattern previously discussed – raises the curious and much discussed problem of why women live longer than men. Some see the answer in the uneven stress due to what they consider to be the dominant role of woman in the North American society, others ascribe it to the greater facility of women to release their emotions. At the root of it lies the question whether the reasons are biological or social. The *Journal of the American Medical Association* concludes in an editorial that “apparently the scientific explanations for longer life among females must be biological rather than social”. It bases this conclusion on the findings of a study among members of religious orders thought to be equally free from certain stresses of competitive life in the modern

¹ At age 100 the frequencies are probably too small to show a clear trend, but at age 70 for instance, the gain over the same period was 6.1 per cent for males, and 18.3 for females. It must be remembered though that reductions in mortality even if small percentagewise may mean substantial absolute numbers because of the larger number of deaths occurring in the older age groups.

community.¹ But is this phenomenon really peculiar to the perhaps gynarchic American society? It is intriguing to see whether it has always been this way here and whether the situation is perhaps different in different cultures. The first part of this question is answered by a glance at the secular trend of life expectancy in Canada. Since figures for life expectancy at birth are not available for the earlier years the following comparison is for the life expected at age 7.² Translated into graphic form in Figure 11, these data reveal that in the early years the males

Life Expectancy at Age 7, Canada, 1871 – 1961

| Year | Male | Female |
|-------------------------|-------|--------|
| 1871 ³ | 58.10 | 57.67 |
| 1881 | 57.60 | 56.25 |
| 1921 | 60.23 | 60.64 |
| 1931 | 60.57 | 61.44 |
| 1941 | 61.45 | 63.88 |
| 1945 | 62.49 | 65.13 |
| 1947 | 62.60 | 65.64 |
| 1951 | 62.99 | 66.90 |
| 1956 | 63.55 | 68.43 |
| 1961 | 63.92 | 69.34 |

were in the more favourable position regarding life expectancy, that the switch occurred sometime around the turn of the century, and that ever since the female gains have been consolidated and expanded. One could correlate this trend with social history and, thinking along similar lines, also see what happens in other parts of the world in entirely different situations and settings. We find then, generally speaking, that in most countries the female life expectancy is greater than the male though to varying degree. Only the following countries could be found where female life expectancy and mortality were lower than, or equal to, the corresponding male data:

¹ "Why Do Females Live Longer?", editorial, Journal of the American Medical Association, April 26, 1958, p. 2184; see also Madigan, F.C., "Are Sex Mortality Differentials Biologically Caused?", The Milbank Memorial Fund Quarterly, April 1957, pp. 202–223.

² Dominion Bureau of Statistics, Canadian Life Tables, for the years indicated; various years of publication.

³ Data for 1871 and 1881 based on the population of four provinces: Ontario, Quebec, New Brunswick, and Nova Scotia.

Life Expectancy at Birth¹

| Country | Year | Male | Female |
|---------------------------------------|---------|-------|--------|
| Upper Volta (indigenous population) . | 1960–61 | 32.1 | 31.1 |
| Guatemala..... | 1949–51 | 43.82 | 43.52 |
| Bolivia..... | 1949–51 | 49.71 | 49.71 |
| Cambodia..... | 1958–59 | 44.2 | 43.3 |
| Ceylon..... | 1954 | 60.3 | 59.4 |

Death Rates²

| Country | Year | Male | Female |
|---------------|------|------|--------|
| Barbados..... | 1960 | 8.3 | 9.2 |
| Ceylon..... | 1959 | 9.1 | 9.2 |
| "..... | 1960 | 8.6 | 8.6 |
| Iceland..... | 1960 | 6.6 | 6.7 |

In all cases, the differences are small enough to result from chance fluctuations unless they could be shown to form one stage in a trend similar to that observed in Canada and other countries; the above change between 1959 and 1960 in Ceylon would support such an assumption. These countries constitute some of the “very few exceptions” to the “common finding throughout the world” of more favourable death rates among females as stated in a United Nations report.³ The same source also confirms “the already known fact that sex differentials in mortality widen as life expectancy grows longer”,⁴ to be common experience in most countries.

The greater male life expectancy in the first two decades after Confederation is due to higher female mortality in certain age groups; “no doubt the causes of the female excess, viz., childbirth, tuberculosis, etc., were more pronounced in their effects in those earlier years”.⁵

In an early analysis of sex differences in mortality in Canada, Keyfitz refers also to the risks of death through childbirth among females aged 23 to 42, whereas “during other periods of life it is reasonable to suppose a higher mortality for the male, menaced as he is by a greater risk of accident as a result of his (usually) more active pursuits both in the earning of a livelihood (occupational diseases, etc.) and in diversion”.⁶ Based on comparisons with the situation as it then existed in England and Wales and the United States, Keyfitz concluded:

¹ United Nations, *Demographic Yearbook 1962*, New York: United Nations, 1962, pp. 576–581.

² World Health Organization, *Annual Epidemiological and Vital Statistics 1960*, Geneva: World Health Organization 1963, pp. 286–293.

³ United Nations, “Age and Sex Patterns of Mortality”, *Population Studies*, No. 22, New York: United Nations 1955, p. 16.

⁴ *Ibid.*

⁵ Dominion Bureau of Statistics, *Canadian Abridged Life Tables, 1871, 1881, 1921, 1931*, Ottawa: The Bureau, 1939, p. 5.

⁶ Keyfitz, N., “Canadian Life Tables 1931”, *Census Monograph No. 13*, Dominion Bureau of Statistics, Ottawa: King’s Printer, 1937, p. 15.

LIFE EXPECTANCY AT AGE 7 FOR MALES AND FEMALES
CANADA, 1871 — 1961

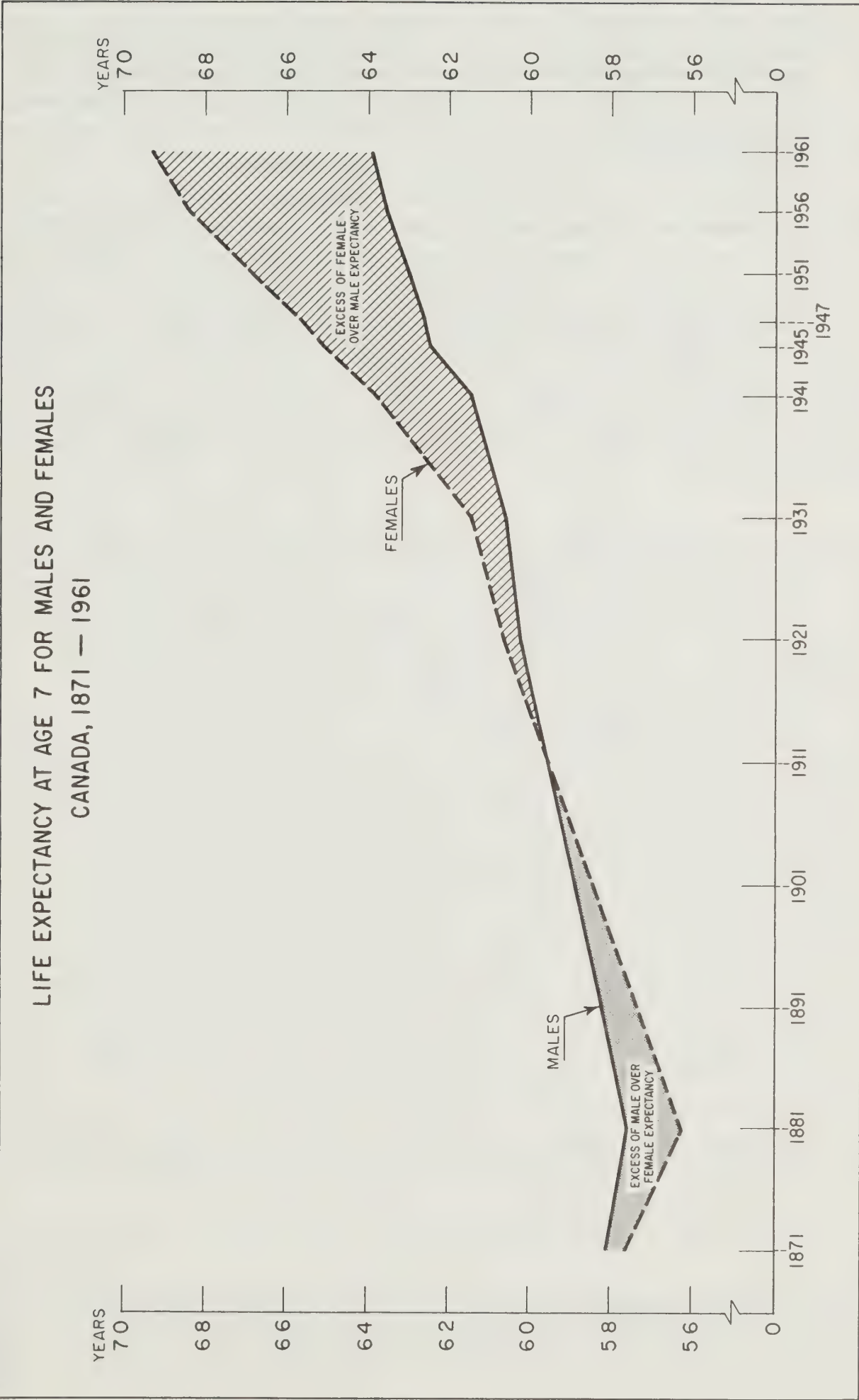


FIGURE — 11

"Thus to gather up the available information — we have seen that the phenomenon seems to be characteristic of rural rather than urban, prosperous rather than depressed populations; of populations low, rather than high, in general mortality. This information we have gathered entirely from the figures of other countries. Canada, with her considerably rural, fairly prosperous, healthy, recently-arrived population, therefore, could be expected to show the female excess mortality to a very great degree and, in point of fact, does so."¹

Some of these characteristics, Canada's rural character for instance, have since undergone considerable changes. The risk from childbirth has been greatly reduced thus improving the survival chances of females in some of the adult age groups. The phenomenon of the differential becomes less of a mystery, however, if we remember that the general death rate is really a composite or the net result of the cause-specific death rates and that by examining these, as will be done briefly in the following chapter, we can establish the components of the divergence in general mortality rates and life expectancy for the two sexes. Differentials such as found in mortality from lung cancer, heart disease, and accidents will explain the over-all picture.

Life tables have become essential tools in many phases of social planning in addition to their many uses for actuarial purposes. Not only the expected length of life but also the chances of survival and of dying at certain ages are important. The time has probably come, therefore, when consideration should be given to more current, perhaps annual compilations of life tables. With the more refined intercensal population estimates at our disposal, the need for waiting for a census year has been removed. An expression of this need and a demonstration of life tables prepared to serve a wide range of needs in social and economic planning, are contained in the recently published life tables for Quebec and its economic regions.² While the Dominion Bureau of Statistics has been publishing life tables for Canada, the larger provinces, and regions, the Quebec report constitutes the first attempt to make information of this type available for regional planning within a province. The report presents, furthermore, life table data for a period between census years thus facilitating the more current observation of trends: "Des besoins nouveaux, suscités en particulier par les exigences de la planification, rendent aujourd'hui nécessaire une exploitation de plus en plus complète de la statistique rassemblée par le service provincial de la démographie".³ And this no doubt applies to other parts of Canada as well. According to the Quebec regional life tables, life expectancy at birth in the various regions ranges from 67.07 to 68.58 for males and from 71.29 to 73.33 for females, whereby in one region the expectancy may be relatively high for one sex but not for the other thus making for varying differentials between the sexes.⁴

¹ Ibid., p. 18.

² Ministère de l'industrie et du commerce, Bureau de la statistique, *Tables de Mortalité abrégées 1957-1959, 1960-1962, Province de Québec et ses régions économiques*, Québec 1964.

³ Ibid., préface.

⁴ Ibid.

Loss of Life Years

“Ideally, death should occur at the end of a more or less lengthy period of life when the biological energy vested in each individual has been spent and the continuing function of the body’s vital organs has reduced them to a state of general deterioration.”¹ Apart from the fact that this ideal timing of death will vary from individual to individual, the ideal is hardly ever reached because of intervening sickness or injury. We must, therefore, look for other criteria to determine the expected length of the life span against which to measure the actual length of life and the resulting loss of life years.

The life tables show the average expected length of life at various ages. This is not an absolute gauge because it rises with improving mortality experience so that the age limit chosen for one year will not remain the static. In the absence of an absolute yardstick for the expected duration of human life, it has become the accepted practice to use the life table value for the life expectancy at birth as the standard to determine what deaths occur prematurely and therefore involve a loss of life years.

According to the most recent life tables, the life expectancy at birth of Canadians stands at about 70 years² but even at age 100 there still is a life expectancy of more than one year left for those reaching that age. For the remaining age groups the expected length of life ranges between about 1 and 70. These values are averages, meaning that some will live longer, others not quite as long. Like other averages, the life expectancy is often used as a standard set-up as a goal to reach for those below that standard. Applied to the existing pattern of mortality, we say that a death at a particular age means a loss of life years corresponding to the number of years the individual was “expected” to live according to the life table.³ Despite its limitations, this concept is useful if used at a particular period of time to compare the impact of mortality from certain causes or the mortality among certain groups in terms of the age at which death occurs. It will be used for that purpose in the following chapter. The concept of life years lost can also be applied to determining the loss of working life if we agree on the generally prevailing approximate age limits of the working life in a given population.

The Vital Statistics Section of the Dominion Bureau of Statistics very kindly agreed to do the calculations for Canada for the year 1961, both for total

¹United Nations, “Age and Sex Patterns of Mortality”, Population Studies, No. 22, New York, 1955, p. 1.

²For many purposes it would be helpful to have the life table values not only for males and females separately but also for both sexes. Taking simply the unweighted mean may be alright for the life expectancy at birth but not when it comes to specific age groups where the male-female proportions may vary considerably.

³No average can be an absolute standard because the average itself will move up the closer some of the now “below average” experiences will approach it. It is the very nature of an average that it can never be reached by all because it would no longer be an average if there were no values below it. But until we can determine an absolute limit of the life span, the average can serve as a useful standard.

and working life years lost. For the latter it was agreed to use the ages between 20 and 65 as the expected working life.¹ Table 14 shows the results for all deaths (from all causes together) for certain age groups and each sex. Deaths among children account, as one would expect, for the greatest loss of life years, followed by the deaths in the age group 45–64. This holds for both males and females but with the loss among the males being on a higher level at all ages except the oldest, following the general pattern of the death rates in the respective categories.

TABLE 14
LIFE AND WORKING LIFE YEARS LOST, BY AGE AND
SEX, CANADA, 1961¹
(in '000's)

| Age | Both Sexes | | Male | | Female | |
|------------------|----------------------------|----------|---------|----------|---------|----------|
| | Years | Per Cent | Years | Per Cent | Years | Per Cent |
| | Life Years | | | | | |
| Under 1..... | 904.1 | 31.5 | 503.5 | 30.0 | 400.6 | 33.5 |
| 1 – 4..... | 140.6 | 4.9 | 78.8 | 4.7 | 61.8 | 5.2 |
| 5 – 14..... | 118.8 | 4.1 | 73.7 | 4.4 | 45.1 | 3.8 |
| 15 – 24..... | 130.4 | 4.5 | 93.2 | 5.6 | 37.2 | 3.1 |
| 25 – 44..... | 310.3 | 10.8 | 191.7 | 11.4 | 118.6 | 9.9 |
| 45 – 64..... | 617.2 | 21.5 | 384.0 | 22.9 | 233.2 | 19.4 |
| 65 – 74..... | 356.2 | 12.4 | 204.0 | 12.2 | 152.2 | 12.7 |
| 75 and over..... | 296.6 | 10.3 | 148.1 | 8.8 | 148.5 | 12.4 |
| Total..... | 2,874.2 | 100.0 | 1,677.0 | 100.0 | 1,197.2 | 100.0 |
| | Working Years ² | | | | | |
| Under 15..... | 757.1 | 56.1 | 441.1 | 52.9 | 316.0 | 61.5 |
| 15 – 19..... | 52.5 | 3.9 | 38.0 | 4.6 | 14.5 | 2.8 |
| 20 – 24..... | 55.5 | 4.1 | 41.1 | 4.9 | 14.4 | 2.8 |
| 25 – 44..... | 232.8 | 17.3 | 149.7 | 17.9 | 83.1 | 16.2 |
| 45 – 64..... | 250.5 | 18.6 | 164.3 | 19.7 | 86.2 | 16.7 |
| Total..... | 1,348.4 | 100.0 | 834.2 | 100.0 | 514.2 | 100.0 |

¹Based on 1956 life table.
²Working life assumed to be between the ages of 20 and 65.
Source: Dominion Bureau of Statistics, special tabulation.

¹ Similar tables have been prepared for Ontario for the years 1932, 1942, and 1952 (Ontario Department of Health, A Study of the Loss of Expected Years of Life Due to Certain Causes, Ontario, Toronto: The Department, 1961) – While the choice of age limits is to a certain extent arbitrary, it must be realistic enough to reflect as closely as possible the actual situation. In the United Kingdom, for instance, Logan and Benjamin have proposed as the limit of “normal life” that age in the life table at which the number of lives surviving is less than 10 per cent of the original entrants, and they set the working period as between the ages of 15 and 65. (Logan, W.P.D., Benjamin, B.), “Loss of Expected Years of Life -- A Perspective View of Changes between 1848–1872 and 1952”, Monthly Bulletin of the Ministry of Health, December 1953, p. 246.

The Implications

Mortality statistics are a direct and well developed measure of the fatal effect of illness and injury. They also provide us with some measure of the prevalence of certain diseases and accidents, and although their limitations become increasingly apparent, they still serve as the main body of statistics for the evaluation of health conditions. Knowledge of the causes of mortality not only supplies some epidemiological information but also at least some indication of the need for health services.

In addition, however, mortality statistics yield some of the basic data for the observation of demographic trends, above all – for the purposes of the health worker – of the life span and the changes it undergoes. If the length of life itself is an important criterion for judging the well-being of an individual or nation, we are next concerned with its attributes: is it healthy, is it a good life in the sense of social opportunity and adjustment, and what does it contribute to the community or the larger society? In regard to most aspects, we still lack adequate answers. One of the main contributions an individual's life makes to the community lies in the amount and quality of work it contributes and also perhaps in raising and maintaining a family. The work – in the economic sense of making a living – an individual contributes is a function largely of education and personal ability, but quantitatively we can measure it best in terms of the duration of working life which, in turn, is a function of the duration of the life or the life expectancy, as well as of such social factors as duration of education and retirement age. Here is an example of the direct relationship of health conditions with the social and economic fabric of the nation. Mention has been made already of the fact that the increase in the life span of Canadians has meant an extension of their potential working life by over 40 per cent over the last 30 years. The study of the expectation of working life, however, is not merely concerned with determining the manpower potential but also with the effect of such phenomena as the extension of school-leaving age and the resulting postponement of entry into the labour force as well as, at the other end of the scale, the problem of retirement which must be considered from the viewpoint of shortening work time on the one hand and the social and economic needs of an aging population:

“Next to the expectation of life, there is perhaps no other more important index of a Nation's social and economic welfare than the expectation of working life. Here, of course, we deal with the duration of that part of a person's total life span spent in labor force activity. Involved here are such key factors as the age at which young people enter the working force; the time they spend on education and training preparing themselves for labor force activity; the age at which men and women exit from the working force, and the changing duration of the period of retirement that ensues.”¹

Accordingly, working life tables have been constructed in several countries. As Canada is not among them, the experience in the United States is probably closest

¹ Wolfbein, S.L., *The Length of Working Life*, paper presented at the Fourth International Gerontological Congress, Merano, Italy, July 1957.

to ours and an example from the United States working life table may also reflect the Canadian situation:¹

Life and Work Life Expectancy at Birth, by Sex,
United States, 1900–1960 (in Years)

| Year | Male | | | Female | | |
|-----------|----------------------|---------------------------|-------------------------|----------------------|---------------------------|-------------------------|
| | Life Expect- ancy | Work Life Expect- ancy | Outside Labour Force | Life Expect- ancy | Work Life Expect- ancy | Outside Labour Force |
| 1900..... | 48.2 | 32.1 | 16.1 | 50.7 | 6.3 | 44.4 |
| 1940..... | 61.2 | 38.3 | 22.9 | 65.9 | 12.1 | 53.8 |
| 1950..... | 65.5 | 41.9 | 23.6 | 71.0 | 15.2 | 55.8 |
| 1960..... | 66.6 | 41.4 | 25.2 | 73.1 | 20.1 | 53.0 |

The main feature of this tabulation is the general increase in expectancy under all three headings up to the last decade. Then, between 1950 and 1960, there was a slight decline in the working life expectancy for males, explained by the author as resulting from a “substantial decline in labor force participation rates in the older years and a continuing increase in age of entry into the work force in the younger years.”² Women, on the other hand, extended their participation in the labour force. These phenomena are matched in Canada; we have already observed the trend towards greater labour force participation among women, and the growing school-leaving age; the Select Committee of the Senate on Aging has recently seen evidence of the shift in sources of income among the aged away from employment and towards transfer payments from public sources.³

Similar tables as for working life expectancy have been prepared for school life where reference is made to the demographic factors, such as changing size and age structure of the population, affecting the growing student body attending school and continuing to do so beyond compulsory school attendance age.⁴

These types of life tables then demonstrate the implications of the increased life span in certain important phases of the life cycle: school and work. The growing importance and complexity of these implications become clear if we contemplate briefly the changes that have occurred in the life cycle during the last century or so. The period of change is of fairly recent origin sparked by the

¹ Wolfbein, S.L., “On the Nature and Conditions of Working Life”, *The American Statistician*, April 1965, p. 21.
² *Ibid.*, p. 20.
³ Podoluk, J.R., *Income Characteristics of the Older Population*, submission to the Senate Committee on Aging, proceedings of the Special Committee of the Senate on Aging, No. 18, October 22, 1964, Ottawa: Queen’s Printer, 1964, p. 1268.
⁴ Stockwell, E.G., Nam, C.B., “Illustrative Tables of School Life”, *American Statistical Association Journal*, December 1963, pp. 1113–1124.

equally recent social changes and scientific development, largely during the lifetime of the present generation. It has been a sudden spurt that ended a long, almost stagnant, period as far as health conditions are concerned.

“...most persons born around 1850 encountered during their lifetime much the same health and mortality conditions that prevailed at the time of their birth. In consequence, the actual average lifetime for a cohort of persons born a century ago did not differ to any considerable extent from their expectation of life at birth. In fact, the indications are that they lived only about one year longer, on an average, than that expected when they were born.”¹

Many of the matters our modern society has to cope with arise from the fact that more people live to an older age and beyond the usual working life, thus facing not only different health problems but also the need for social adjustment and economic provision for a lengthening period of retirement. Social security measures are part, but only a part of such provisions. We shall have to revise our thinking and the accustomed image of old age. The lengthening life span has implication on the individual's role in the family as well as in the community. The association between marriage, widowhood, and mortality has been studied,² and attention has been drawn to the shifting relationships between the generations within the family. Tables of family life, like those for work and school life, may well prove useful tools in social planning for a changing population. “Formerly”, an editorial in the *American Journal of Public Health* comments, “the mean age of children at the death of one parent was 14 ... today, the ‘average’ son may be 55 to 60 years of age at his father's death.”³ And another illustration:

“Traditionally, parents died before the education of their youngest children was completed. Now, -a normal couple will survive the marriage of their youngest child by 15 to 20 years.”⁴

The chances of orphanhood among children have been reduced by the trends towards longer life and earlier marriage but the likelihood is greater of a child losing the father than the mother.⁵ While the greater life expectancy among women means survival and widowhood for more married women, the life expectancy of marriages has also increased.⁶

In a study of the cycle of family responsibility, defined in terms of the number of children under 18, the Metropolitan Life Insurance Company finds that in the United States at the peak of this responsibility the husband is most

¹ Jacobson, P.H., “An Estimate of the Expectation of Life in the United States 1850”, The Milbank Memorial Fund Quarterly, April 1957, p. 201.

² For instance, Sheps, M.C., “Marriage and Mortality”, American Journal of Public Health, April 1961, pp. 547-555, and references.

³ “Some Consequences of an Increased Life Span”, editorial, American Journal of Public Health, December 1959, p. 1683.

⁴ Ibid.

⁵ “Family Responsibilities Increasing”, Statistical Bulletin, Metropolitan Life Insurance Company, April 1959, pp. 3-5.

⁶ “Increased Chances of a Golden Wedding”, Statistical Bulletin, Metropolitan Life Insurance Company, November 1957, pp. 1-3.

likely to be between the ages of 25 and 44. During the period ahead to 1975, younger couples where the husband is 25–34 will experience a more rapid rise, whereas couples with the husband 35–44 years old are expected to show little change in number.¹

When, then, does old age begin? When is a man or woman old under the present conditions of life expectancy? It varies, of course, from individual to individual, and the term probably should not be used at all without the qualification of "old for what". The social institution of a fairly uniform retirement age has made the age 65 almost synonymous with the beginning of old age. This is unfortunate on the one hand, because many above that age are not old in any sense of the word, while on the other hand it leads to neglecting the fact that symptoms of old age often have their onset long before the 65th birthday. This discussion is perhaps best concluded with a reference to the results of a survey undertaken by the Medical Women's International Association. While the report deals only with women, most of it is true for members of both sexes. The survey found a wide variety of opinions: from the biological viewpoint, opinions ranged from the 40's in some countries (Austria, Germany, Israel, Iran, New Zealand, Vietnam) to 70–80 (Canada, Finland, Great Britain, Netherlands, Norway, Switzerland). Similarly, from the social viewpoint replies varied from 35 to 75 years. In regard to economic activity, the limit is generally lower and related to the difficulty of getting a job at ages from 35 to 45–50.² Similar was the lack of unanimity regarding the degree of correlation between chronological and physiological age.

It has been said that life is but the road to death³ and that man begins to age as soon as he is born; but he also first begins to be young then.

Canada and Other Countries

One method of judging the health status of the Canadian people is to compare selected health indicators for Canada and other countries. For an evaluation of the situation in Canada a comparison with countries of similar social and economic structure and standards is necessary. Thus, the United States, England and Wales, and some Scandinavian countries may be compared with Canada in terms of certain statistics which are considered to be indicative of general health conditions. The following data refer to the year 1959:⁴

¹ "The Peak of Family Responsibilities", Statistical Bulletin, Metropolitan Life Insurance Company, August 1959, pp. 1–3.

² The Old Woman, reports presented at the Extraordinary General Assembly of the Medical Women's International Association, Baden-Baden, Germany, 1960, as reported in *American Journal of Public Health*, February 1962, p. 312. (A recent news item stated that airline stewardesses are considered by one airline too old at age 32.)

³ "Tota vita nihil aliud quam ad mortem iter est" (Seneca, *Consolatio ad Polybium*).

⁴ Also by the time of completion of this study, data may be available at least for 1960, these tables were not changed because they appeared that way in the Report of the Royal Commission on Health Services, Vol. I, and also because the emphasis here is on the relative position of various countries which changes but little from year to year. Most of the countries would show some improvement during the year in regard to the various indicators.

| Country | Infant Mortality Rate per 1,000 Live Births | Mortality Rate From All Infective Diseases per 100,000 Population | Infective Disease Deaths as Per Cent of All Deaths | Maternal Mortality Rate per 100,000 Live Births | Life Expectancy at Birth | Crude General Mortality Rate per 1,000 Population |
|--------------------|---|---|--|---|--------------------------|---|
| Canada | 28.4 | 10.8 | 1.4 | 54.9 | 70.3 | 8.0 |
| U.S.A..... | 26.4 | 12.8 | 1.4 | 37.4 | 69.6 | 9.4 |
| England and Wales. | 22.2 | 13.7 | 1.2 | 38.7 | 71.0 | 11.6 |
| Denmark | 22.5 | 8.2 | 0.9 | 43.3 | 71.2 | 9.3 |
| Norway | 18.7 | 12.6 | 1.4 | 39.7 | 72.9 | 8.9 |
| Sweden | 16.6 | 10.9 | 1.2 | 23.8 | 72.6 | 9.5 |

Source: See Table 15.

Canada’s record is not as good as that of the five other countries with which it is compared, in regard to infant and maternal mortality. The rates for Canada, however, are the net total of widely varying provincial rates as shown in the following tabulation for 1959, the year to which the international comparison refers:

| Province | Infant Mortality Rate per 1,000 Live Births | Maternal Mortality Rate per 100,000 Live Births |
|----------------------------|---|---|
| Newfoundland | 39 | 81 |
| Prince Edward Island..... | 31 | Nil |
| Nova Scotia | 31 | 42 |
| New Brunswick | 33 | 36 |
| Quebec | 33 | 73 |
| Ontario | 24 | 46 |
| Manitoba..... | 27 | 61 |
| Saskatchewan | 26 | 41 |
| Alberta | 24 | 37 |
| British Columbia..... | 25 | 43 |
| Yukon | 26 | Nil |
| Northwest Territories..... | 129 | 505 |
| Canada | 28 | 55 |

Source: Dominion Bureau of Statistics, Vital Statistics 1959, Ottawa: Queen’s Printer, 1961, pp. 66, 214 and 215.

Maternal mortality ranged from 36 in New Brunswick to 505 per 100,000 live births in the Northwest Territories. Thus, in every province there has been less than one maternal death in every thousand live births, the Northwest Territories showing an exceptionally high rate.

Infant mortality ranged from a rate of 24 per 1,000 live births in Ontario and Alberta to 129 in the Northwest Territories. Infant mortality is at least as much a social problem as it is a medical one. The correlation between high infant mortality and low economic status is illustrated in the following tabulation ranking the provinces according to their infant mortality and per capita personal income:

| Infant Mortality Rate per 1,000 Live Births and Ranking of Provinces, Average 1959–1961 | | | Per Capita Personal Income, Average 1959–1961 | | |
|---|-------------------------|------|--|-------------------------|-----------|
| Rank | Province | Rate | Rank | Province | Income \$ |
| 1 | Ontario | 23.5 | 1 | Ontario | 1,807 |
| 2 | British Columbia | 24.4 | 2 | British Columbia | 1,786 |
| 3 | Alberta | 25.7 | 3 | Alberta | 1,570 |
| 4 | Saskatchewan | 26.1 | 4 | Manitoba | 1,520 |
| 5 | Manitoba | 27.4 | 5 | Saskatchewan | 1,338 |
| 6 | Nova Scotia | 29.4 | 6 | Quebec | 1,311 |
| 7 | New Brunswick | 29.7 | 7 | Nova Scotia | 1,163 |
| 8 | Quebec | 31.6 | 8 | New Brunswick | 1,031 |
| 9 | Prince Edward Island .. | 32.0 | 9 | Prince Edward Island .. | 961 |
| 10 | Newfoundland | 37.5 | 10 | Newfoundland | 874 |

Source: Based on Dominion Bureau of Statistics, Vital Statistics 1959, 1960, 1961; and National Accounts, Income and Expenditure, 1961, Ottawa: Queen's Printer, various years.

The rank correlation is statistically highly significant; Kendall's rank correlation coefficient:

$\tau = 0.87$, and $\frac{S}{O} = 3.5$

A similar correlation between infant mortality, income, and the availability of hospital beds has been established for forty different countries by Armstrong.¹

The infant deaths in the “developing” areas of Canada amount to a small percentage only of all infant deaths in Canada and, therefore, have very little effect on the national rate. In 1959, not one of the provinces had reached the level of the European countries chosen for comparison, but the area from Ontario to the West Coast had rates similar to that of the United States.

An evaluation of Canadian health indices in comparison with other parts of the world would not be complete, however, if it were limited to countries with similar social, economic and health conditions. We must also be aware of the wide gulf which separates the people of many countries from Canada's relatively fortunate position in regard to its health and health services. Such awareness will underline Canada's obligations as well as the implications on its own health problems because of the close contact with all parts of the world in

¹ Armstrong, A., Infant Mortality, Some Possible Determinants, paper submitted for publication to Canadian Journal of Public Health, June 1966.

an age of rapidly developing travel and transportation. Table 15 provides data for international comparisons.

TABLE 15
SELECTED HEALTH STATISTICS FOR CANADA AND OTHER
COUNTRIES,¹ ABOUT 1959

| Country | Crude Mortality Rate per 1,000 Population | Infant Mortality Rate per 1,000 Live Births | Infant Deaths as Per Cent of All Deaths | Maternal Mortality Rate per 100,000 Live Births | Infectious Disease Mortality Rate per 100,000 |
|-------------------------|---|---|--|--|---|
| Africa | | | | | |
| Egypt..... | 16.6 | 145.0 | 34.3 | — | 66.3 |
| America | | | | | |
| Argentina | 8.8 | 61.8 | 16.3 | — | — |
| Canada | 8.0 | 28.4 | 9.7 | 54.9 | 10.8 |
| Chile..... | 12.5 | 119.7 | 33.9 | — | — |
| Colombia | 12.8 | 96.9 | 33.4 | — | — |
| Jamaica | 10.0 | 67.8 | 26.3 | — | — |
| Trinidad | 9.1 | 62.2 | 25.4 | — | — |
| U.S.A..... | 9.4 | 26.4 | 6.8 | 37.4 | 12.8 |
| Venezuela | 9.2 | 55.3 | 31.6 | 130.1 | 67.4 |
| Asia | | | | | |
| India | 12.1 | 100.0 | 20.6 | — | — |
| Japan | 7.5 | 33.7 | 7.9 | 146.4 | 49.1 |
| Europe | | | | | |
| Austria | 12.5 | 39.8 | 5.6 | 97.3 | 33.2 |
| Belgium | 11.4 | 30.4 | 4.6 | 51.2 | 23.9 |
| Denmark | 9.3 | 22.5 | 3.9 | 43.3 | 8.2 |
| England and Wales | 11.6 | 22.2 | 3.1 | 38.7 | 13.7 |
| Finland..... | 8.8 | 23.6 | 5.1 | 67.3 | 36.2 |
| France..... | 11.3 | 29.5 | 4.8 | 55.0 | 32.6 |
| Hungary | 10.4 | 52.4 | 7.6 | 80.0 | 41.8 |
| Italy | 9.3 | 45.4 | 9.0 | 108.9 | 29.7 |
| Luxembourg | 11.1 | 37.3 | 5.2 | — | 16.8 |
| Netherlands | 7.6 | 16.8 | 4.7 | 50.0 | 9.1 |
| Norway | 8.9 | 18.7 | 3.7 | 39.7 | 12.6 |
| Poland | 8.6 | 71.9 | 20.6 | — | — |
| Portugal..... | 10.8 | 88.6 | 19.3 | 123.4 | 74.5 |
| Spain..... | 9.0 | 47.1 | 11.4 | — | 40.7 |
| Sweden | 9.5 | 16.6 | 2.5 | 23.8 | 10.9 |
| Switzerland | 9.6 | 22.2 | 4.1 | 66.7 | 23.0 |
| West Germany | 10.8 | 34.3 | 5.2 | 108.4 | 22.4 |
| Oceania | | | | | |
| Australia | 8.9 | 21.5 | 5.5 | 45.8 | 10.9 |
| New Zealand | 9.0 | 23.9 | 7.0 | 49.3 | 10.5 |
| U.S.S.R. | 7.6 | 40.6 | — | — | — |

TABLE 15 (Concluded)
SELECTED HEALTH STATISTICS FOR CANADA AND OTHER COUNTRIES,¹
ABOUT 1959

| Country | Infective Disease Deaths as Per Cent Of All Deaths | Mortality Rate Age 1-4 per 1,000 Population | Life Expectancy at Birth | Population per Physician | Population per Hospital Bed |
|-------------------------|---|---|--------------------------------|--------------------------------|--------------------------------------|
| Africa | | | | | |
| Egypt | 3.5 | 50.8 | — | 2,700 | 480 |
| America | | | | | |
| Argentina | — | — | — | 730 | 160 |
| Canada | <u>1.4</u> | <u>1.2</u> | <u>70.3</u> | <u>920</u> | <u>90</u> |
| Chile | — | — | — | 1,700 | 260 |
| Colombia | 10.9 | 18.3 | — | 2,500 | 330 |
| Jamaica | — | — | — | 4,300 | 240 ³ |
| Trinidad | 5.1 | 3.2 | 61.5 | 2,600 | 240 ³ |
| U.S.A. | 1.4 | 1.1 | 69.6 | 790 | 110 |
| Venezuela | 7.3 | 8.8 | — | 1,400 | 290 |
| Asia | | | | | |
| India | — | — | — | 5,200 | 2,000 |
| Japan | 6.6 | 2.8 | 67.6 | 930 | 120 |
| Europe | | | | | |
| Austria | 2.7 | 1.7 | 64.4 | 620 | 110 |
| Belgium | 2.1 | 1.3 | 64.7 | 800 | 130 |
| Denmark | 0.9 | 1.0 | 71.2 | 830 | 110 |
| England and Wales | 1.2 | 0.9 | 71.0 | 960 | 110 |
| Finland | 4.1 | 1.4 | — | 1,600 | 110 |
| France | 2.9 | 1.4 | 68.1 | 950 | 110 |
| Hungary | 3.9 | 1.7 | 67.2 | 650 | 150 |
| Italy | 3.3 | 2.2 | 67.9 | 620 | 110 |
| Luxembourg | — | 1.2 | 63.7 | 910 | 100 |
| Netherlands | 1.2 | 1.3 | 72.5 | 900 | 130 |
| Norway | 1.4 | 1.0 | 72.9 | 900 | 110 |
| Poland | 7.4 | — | 65.9 | 1,100 | 150 |
| Portugal | 6.8 | 9.4 | 62.4 | 1,300 | 190 |
| Spain | — | — | — | 1,000 | 310 |
| Sweden | 1.2 | 0.9 | 72.6 | 1,100 | 90 |
| Switzerland | 2.4 | 1.3 | 68.6 | 740 | 80 |
| West Germany | 2.0 | 1.4 | 69.2 | 730 | 100 |
| Oceania | | | | | |
| Australia | 1.2 | 1.2 | 69.9 | 860 | 90 |
| New Zealand | 1.5 | 1.2 | 70.4 | 700 | 90 |
| U.S.S.R. | — | — | 67.5 | 550 ² | 130 |

¹ Compilation based on World Health Organization Annual Epidemiological and Vital Statistics 1959, Geneva, 1962, passim, and United Nations Demographic Yearbook 1960, New York, 1961, passim.

² 310 if "feldschers" counted.

³ West Indies Federation.

Note: Some of the differences apparent in the table may be due to variation in report years (life expectancy figures in particular range from 1951 to 1959); differences in the quality of the underlying data, or differences between preliminary figures reported to the United Nations and the final national figures.

HEALTH IN CANADA AND ELSEWHERE

There are three broad reasons for Canada's close interest in and concern with the health of other countries:

1. the danger to Canada and Canadians from communicable diseases anywhere in the world,
2. the benefits derived from international co-operation in the study and control of health hazards,
3. the obligations towards countries with much poorer health conditions than Canada's.

This is not putting the reasons into any particular order; if this were to be done, the last should probably come first as the obligation of a health-affluent country towards the health-poorer ones.

Comparisons of various health indicators and mention of health problems in other parts of the world are made in this study for two reasons: first in order to put Canada's record into the perspective of the situation elsewhere, and secondly as a reminder of the fact that health problems elsewhere in this world are also Canada's problem to an extent which is not sufficiently recognized.

The most direct and obvious aspect of this indivisible world health will be found in the area of communicable diseases. Here it is true not only that this is one world but also that it is one which is becoming progressively smaller with the increased speed of transportation and its growing use. The result is a highly increased mobility of people in formerly far distant and isolated parts of the world. While climatic factors come to the aid of quarantine measures in keeping certain disease vectors out or ineffective, it is well to remember that "a typhus louse or a plague flea, brushed off the rags of a beggar in an Eastern bazaar, can be in Tokyo or Oslo, New York or Moscow, London or Sydney, within a few hours".¹ This danger, ever present at our doorstep, is discussed and illustrated in the following chapter.

While our efforts to keep out the louse or the flea will have to continue as safeguards against emergencies in the long run it will be far more effective to eliminate the beggar, in the East or West, who harbours the dangerous lice and fleas or other parasites. This points directly towards Canada's obligations, or really self-interest in the field of social and economic aid to or collaboration with other countries. We shall confine our remarks here, however, to the narrower concept of health and thus to Canada's participation in international co-operation in the health field proper and particularly in the work of the World Health Organization.

The World Health Organization is one of the specialized agencies of the United Nations. Canada has the distinction of being among the nations instrumental in creating the Organization, the third one to ratify its charter, and the one to provide in Dr. Brock Chisholm the first Director General of the

¹ Brockington, F., *World Health*, Harmondsworth: Penguin Books, 1958, p. 217.

Organization. Canada is the sixth largest contributor of funds to the Organization. There are 58 Canadians serving on the Organization's professional staff, which is over 4 per cent of the total.¹ It was a most gratifying experience for the writer at one of the Organization's field stations at one time to count three Canadians among a staff of ten on long-term assignments, in addition to several others visiting the area for shorter periods. Assignments of this kind mean more than one-sided help, added prestige and general good-will. Those serving in other countries return with a far better appreciation of the world's health problems, of methods of dealing with them, and of programmes and procedures from which domestic institutions may also profit as well. In addition to the World Health Organization, Canada participates in a number of United Nations commissions and committees – such as those on narcotics and atomic radiation – as well as in other United Nations agencies directly or indirectly concerned with health.² Health oriented plans are also supported by a number of projects as part of Canada's general external aid programme, including the Colombo Plan. The focal point for most of these programmes is the International Health Unit in the Health Services Directorate of the Department of National Health and Welfare. Besides, several private organizations have made great contributions to foreign assistance in the health field. The Canadian Red Cross has made many outstanding contributions, the biggest perhaps in the Congo. The Committee on Medical Education of the Canadian Medical Association observed:

“There are many organizations in Canada dedicated to the purpose of providing medical aid abroad. A complete list of these is not available, but the Association of Canadian Medical Colleges is attempting to compile one at the present time. Several of our universities are assisting foreign medical schools, CARE, Medico and the Church Missions are recruiting Canadian doctors for foreign assignments, to mention just a few. Lack of co-ordination among these various efforts is apparent.”³

In addition to the assistance carried beyond Canada's borders, there is that provided by facilitating the training of foreign students in Canada, with some soul-searching going on whether it is preferable to educate people inside or outside their own country or in centres strategically located in close proximity to countries requiring this service. The selection of such areas involves, as the Canadian Medical Association puts it, “painful but necessary discrimination”,⁴ but it is part of urgently needed arrangements to ensure the most effective and efficient use of the limited resources, particularly in personnel, which Canada has available for assistance in the health field.

Compensating for the contributions Canada has been making to the promotion of global health are the benefits derived from international co-operation in the health field. Control of communicable diseases is but one of those benefits,

¹ Layton, B.D.B., “Canada's Role in International Health”, *Canadian Journal of Public Health*, June 1962, pp. 242--247.

² *Ibid.*, p. 243.

³ Canadian Medical Association, Report of the Committee on Medical Education, para. 270, p. 53.

⁴ “I.C.Y.”, editorial, *Canadian Medical Association Journal*, January 16, 1965, p. 136.

perhaps the most spectacular one. Other important ones are the opportunities for wide ranging international research, and the availability in many fields of health and health services of expert opinions gathered from outstanding people all over the world. Several important sets of standards, classifications, and other guide lines have thus been provided.

One can well agree with Fraser Brockington's conclusion of his book on World Health:

"Our world tour is over and every reader is back in his homeland — the best in the world; if a little wiser, less complacent and more aware of the world-wide issues from which no country can now stand aloof, then these words have served their purpose."¹

SUMMARY

The comparison with countries of similar socio-economic structure shows areas requiring improvement in the health status of the Canadian people. Where Canada falls behind is the area of infant mortality and this can be traced to the situation in certain provinces and regions, that in the Northwest Territories being particularly distressing. Here the infant mortality is at a level found only in some parts of Africa, South America, and certain of the smaller islands in the West Indies. Only because of the comparatively small population in the Northwest Territories is the rate prevalent there but little reflected in the national rate.

While, on the whole, the figures for Canada are not too far out of line with those of other countries with a similar social structure, the wide gulf between these advanced countries and many of the developing ones should be noted. In the former, the deaths among infants represent about five to ten per cent of all deaths, whereas in the latter we find infant deaths amounting to as much as one-quarter to one-half of all deaths. Similarly, Canada's death rate from infectious diseases like that of most other western nations is only a fraction of that found in many countries of Asia, Africa, Central and South America, and even in some countries in Europe — a reminder that in other parts of the world tens of thousands of people are still dying every year from such diseases as cholera, smallpox, plague, malaria, and other epidemic diseases which in Canada are a thing of the past.

At the beginning of this chapter we emphasized that there are no means of measuring health as such by some absolute gauge. The available indicators permit at best a relative judgment. The declining mortality rates and increasing life span can probably be taken as indications of a better standard of health than existed in previous decades; an international comparison suggests that despite inadequacies in some health fields, Canada's experience is not too far from that prevailing in other countries with similar levels of living.

¹ Brockington, F., *op. cit.*, p. 340.

CAUSES OF ILLNESS AND DEATH

“Both the forms of diseases are many and the
healing of them is manyfold”
Hippocrates - Nature of Man

In the foregoing chapter an over-all appraisal of health and ill health, life and mortality has been attempted. It must be remembered, however, that the general picture is the aggregate of many components which are not homogeneous and which exert their influence in different ways. The general death rate, for instance, is the net result of rates for individual causes some of which are increasing, while others decline or remain on the same level. Hence, in order to interpret changes and differences in such general indicators as those presented, one must review the various specific factors which produce them. Evaluation of these factors will permit a clearer identification and assessment of the broad health problems.

Furthermore, most of the diagnostic and treatment services and some of the preventive services are directed towards certain diseases. Only comparatively few like nutrition, sanitation, fitness programmes, routine examinations, and some forms of health education are concerned with the maintenance of health as such. It is the type and frequency of various illnesses and injuries which basically determine the demand for health services and which indicate what services are needed.

In this discussion of various diseases and disease groups the emphasis is on their effect on the individual and the health services rather than their etiology in the sense of epidemiological studies. The main concern, therefore, will be with those manifestations which 1) affect the individual such as duration of illness or disability, and death, and 2) reflect the demand for health services in terms of hospitalization, physician's and nursing care, or drugs.

For a study of a general nature like the present one it was thought best to classify causes of illness and injury into broad groups as are found in the seventeen main classes of the International Classification of Diseases; they are presented in that order.

INFECTIVE AND PARASITIC DISEASES

Looking at this group of diseases from the point of view of health services, we find that, unlike other disease groups, it is not so much their actual as their potential occurrence which determines the need for services, in this case largely the

control measures which traditionally have been the responsibility of the public health agency.

The recent trend in the pattern of our health problems is characterized in a general way by the successful control of the infective and parasitic diseases with a resulting reduction in the mortality from these diseases in the lower age groups, thus extending the average life span and exposing more and more people to the chronic and degenerative diseases peculiar to the older age group. Yet, these diseases with their epidemic outbreaks and high fatality rates once constituted the main health problem, in fact the only public health problem. It was the recurrence of disastrous epidemics which led to the establishment of the local and provincial health agencies in Canada. It was then recognized that in order to control a disease and to provide adequate service, one must know something about its occurrence. Then the logical step was taken of instituting a system of reporting or notification of these diseases, which is still in force and useful though anachronistic in some respects. We have, therefore, information regarding this group of diseases which does not exist for any other diseases.¹ True, the notification leaves much to be desired: while it is fairly complete for the major and serious diseases, many physicians do not report cases of all notifiable diseases that come to their attention. Nevertheless we can assume a certain consistency in either reporting or non-reporting so that the resulting statistics will still correctly indicate at least the trend. Not all infective and parasitic diseases are notifiable in Canada. The Dominion Council of Health revises from time to time the list which forms the basis for the weekly reports by the Dominion Bureau of Statistics and this list now excludes such diseases as measles, chickenpox, mumps, and influenza.

Included in this group are tuberculosis and all other known communicable diseases with the exception of influenza and the common cold which the classification combines with the diseases of the respiratory system. New concepts of the nature of some yet little understood viruses may bring about a change in the assessment of this group of diseases.

While the diseases in this group have in common their infectiveness and communicability, they are perhaps the most heterogeneous of the seventeen classes of the International Classification, with individual diseases requiring entirely different measures for their control. This will account for the perhaps seemingly disproportionate amount of space they are given in this chapter.

Table 16 and Figure 12 demonstrate the reduction which has taken place over a recent ten-year period in the mortality from infective and parasitic diseases. They also indicate that separations from hospitals, after following an upward trend for the first few years, declined somewhat; the decline did not follow the extent of decline in mortality but showed signs of levelling off in recent years. This is one example for the previous statement that a decline in mortality does not necessarily entail a corresponding decline in illness and the demand for health services.

¹ Strangely enough, this essential type of information has been badly neglected by our modern health agencies in regard to the contemporary major health problems: we have in this country no complete and reliable data on the incidence or prevalence of such diseases as cancer, heart disease, mental disorders, physical impairments, etc.

TABLE 16
INFECTIVE AND PARASITIC DISEASES, RATES OF MORTALITY AND HOSPITAL
SEPARATIONS, AND INDICES,
CANADA, 1951-1963

| Year | Deaths per 100,000 Population ¹ | Per Cent of 1951 Rate | Hospital Separations Rate per 100,000 Population ² | Per Cent of 1951 Rate |
|-----------|--|-----------------------------|--|-----------------------------|
| 1951..... | 34.6 | 100.0 | 491 | 100.0 |
| 1952..... | 28.5 | 82.4 | 630 | 128.3 |
| 1953..... | 23.5 | 67.9 | 664 | 135.2 |
| 1954..... | 17.8 | 51.4 | 485 | 98.8 |
| 1955..... | 15.8 | 45.7 | 465 | 94.7 |
| 1956..... | 14.6 | 42.2 | 447 | 91.0 |
| 1957..... | 12.6 | 36.4 | 392 | 79.8 |
| 1958..... | 10.8 | 31.2 | 443 | 90.2 |
| 1959..... | 10.8 | 31.2 | 361 | 73.5 |
| 1960..... | 9.5 | 27.5 | 398 | 77.0 |
| 1961..... | 8.7 | 25.1 | 372 | 75.8 |
| 1962..... | 8.1 | 23.4 | 310 | 63.1 |
| 1963..... | 7.5 | 21.7 | 340 | 69.2 |

¹ Dominion Bureau of Statistics, annual reports of Vital Statistics, Ottawa: Queen's Printer, various years.

² Department of Public Health, annual reports of Saskatchewan Hospital Services Plan, Regina: Queen's Printer, various years.

Note: This and the following similar tables in this chapter have been prepared in order to supplement the mortality statistics by some indicator which would at least partly reflect the extent of morbidity and/or the resulting demand for health services. In the absence of statistics on incidence or prevalence of most diseases, the separation rates from Saskatchewan hospitals were chosen as being available in a consistent form for the period under review. An exception was made for tuberculosis and mental illness, where the first admission rates are used. Neither set of rates reflects adequately either incidence, prevalence, or the demand for services resulting from certain diseases but they serve to demonstrate that fatality alone cannot be taken as a criterion for the extent of certain health problems or their trend.

The Successes

Rare Diseases

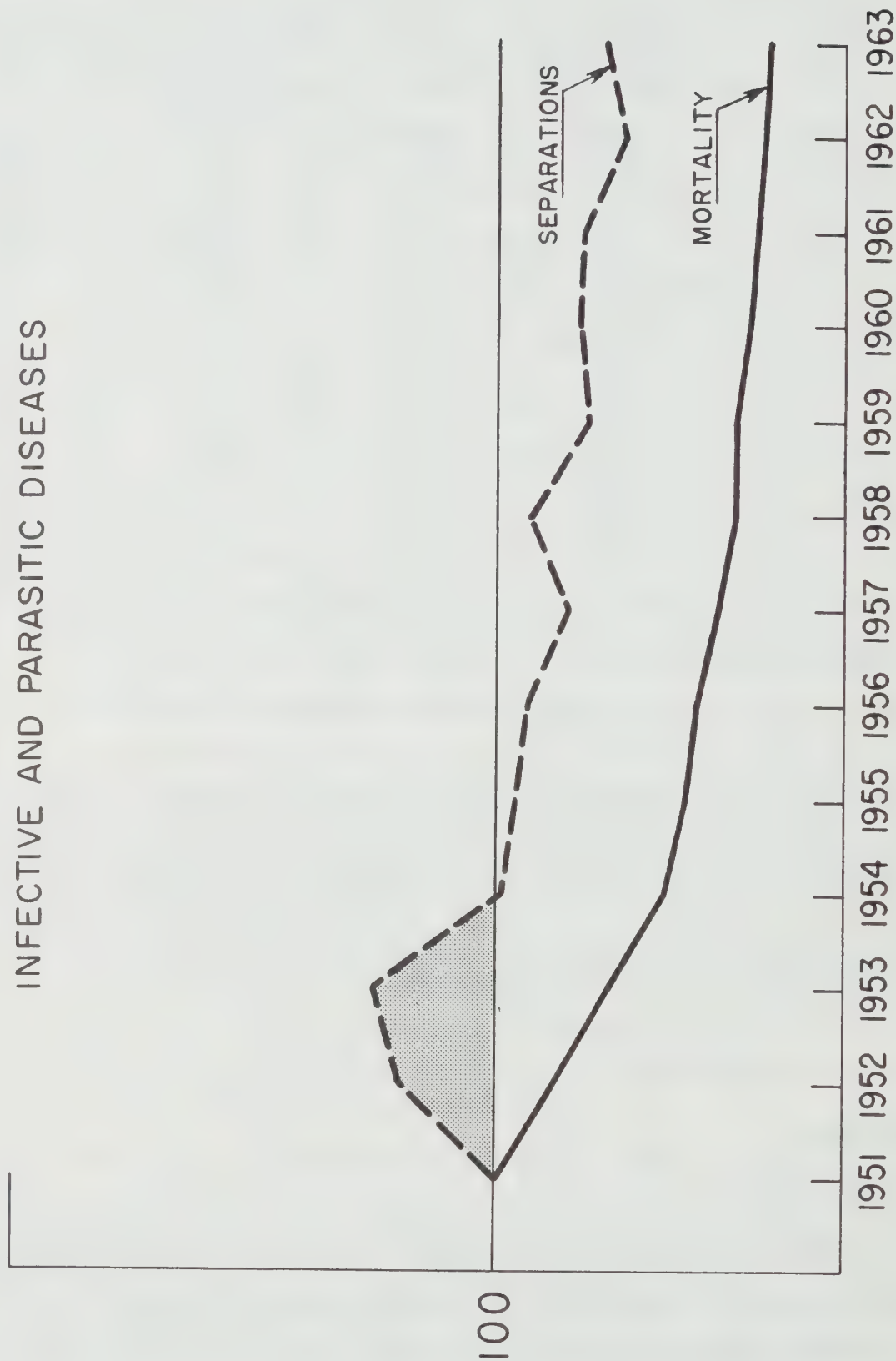
One notes with satisfaction the list of what are officially referred to as "rare diseases", in Canada:¹ anthrax, botulism, cholera, leprosy, malaria, plague, psittacosis and ornithosis, rabies in man, relapsing fever, rickettsial diseases (typhus, etc.), smallpox, tetanus, trichinosis, tularaemia, and yellow fever. Some of these diseases were once rampant in Canada as they still are in large parts of the world.

¹ Dominion Bureau of Statistics, Weekly Reports of Notifiable Diseases.

FIGURE - 12

PERCENTAGE CHANGE IN RATES OF MORTALITY AND HOSPITAL SEPARATIONS
1951-1963

INFECTIVE AND PARASITIC DISEASES



Source: Table 16

Table 17 has been added because it illustrates vividly that while on the one hand very few cases occur, on the other hand some cases do occur which demonstrate the need for continuing effective control measures. In the year 1924 there were 2,769 cases of smallpox reported in Canada which resulted in 64 deaths. Nobody has died from this disease in Canada since 1940, and since 1947 only one case has been reported (in 1962) which was brought to Canada from abroad. This example leads to the following observations regarding this group of diseases:

- (a) they are rare, i.e., not significant numerically, although some are so serious that even a single case may constitute a major health problem (note, for example, the precautions taken in the case of a suspected case of smallpox);
- (b) though rare, there are sufficient cases to indicate that "it can happen here" if the vigilance of the public health authorities is relaxed;
- (c) they demonstrate the success of systematic control measures.

The fact that since 1924, when bookkeeping was set up, no cases or deaths have been reported for cholera, plague, relapsing fever, typhus, and yellow fever, and furthermore that the few cases of leprosy, smallpox, and malaria are largely cases brought back to Canada from abroad, may invite the complacent notion that these diseases are real problems only in far away countries. But it should be remembered that diseases like cholera, smallpox, and typhus once constituted the major health problems even within Canada. Nor is malaria completely foreign to Canada. It was probably malaria which as "swamp fever" was endemic in Upper Canada around Kingston and York in the early 19th century and, in what is now the playground area of the Rideau Lakes, played havoc with those working on the construction of the Rideau Canal. Colonel By himself contracted the disease and "many died from it, how many will never be known".¹ It is also worth recalling that the first isolation hospital in Ottawa was erected in 1832² to cope with a cholera epidemic ravaging the colonies along the Gulf of St. Lawrence and the river.

Today the reading of the weekly summary of notifiable diseases published by the Dominion Bureau of Statistics is almost monotonous as far as it concerns the international reports of cases of smallpox turning up here and there. Suddenly, for the week ending August 25, 1962, the Weekly Epidemiological Report, issued by the World Health Organization in Geneva, carried the following notice:

"On August 10, a 15-year old boy and his family left Sao Paulo, Brasil, on Aerolineas Argentinas, Flight 322, and arrived at Idlewild, New York City, on August 11. They proceeded the same day by train (New York Central Train No. 21) to Toronto; his mother, brother and sister proceeded further to Alberta. The boy was admitted to hospital in Toronto on August 18. The diagnosis of smallpox was confirmed on August 20. Onset of disease: August 2; appearance of rash: August 11.

"It is recalled that, under the provisions of the International Sanitary Regulations, Toronto may not, on account of this imported case, be considered as a smallpox infected area."

¹ Legget, R., "Rideau Waterway", Toronto: University of Toronto Press, 1955, p. 51. ("Throughout the summer of 1828, the fever was especially bad everywhere in Upper Canada, and particularly so along the Canal, almost all the work being completely shut down for weeks, at certain places even for months.").

² Ibid.

TABLE 17 (Concluded)

Years

| Disease | 1943 | 1944 | 1945 | 1946 | 1947 | 1948 | 1949 | 1950 | 1951 | 1952 | 1953 | 1954 | 1955 | 1956 | 1957 | 1958 | 1959 | 1960 | 1961 |
|----------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Anthrax..... | C 2 | - | - | 2 | - | 2 | - | - | - | - | - | - | - | - | - | 1 | - | - | 1 |
| Botulism..... | D - | - | - | 1 | - | 1 | - | 1 | 1 | - | - | - | - | - | 3 | - | 1 | 6 | 9 |
| Cholera..... | D - | 6 | - | - | 1 | 3 | 4 | - | - | - | 2 | 7 | - | 8 | 3 | 1 | 1 | 6 | 6 |
| Leprosy..... | D - | 4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Malaria..... | C 1 | 1 | 1 | - | - | - | 1 | - | 3 | - | 2 | 1 | - | 3 | 3 | 2 | - | 2 | 1 |
| Plague..... | D 2 | 38 | 14 | 9 | 9 | 1 | 1 | - | - | 17 | 4 | 8 | 3 | 1 | 1 | 2 | - | 5 | 1 |
| Psittacosis, Ornithosis .. | D 1 | 6 | - | - | 1 | 2 | 1 | - | 1 | 3 | - | - | - | - | - | - | - | 2 | - |
| Rabies (in man)..... | C - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Relapsing Fever | D - | 1 | - | - | 1 | - | - | - | - | - | - | 1 | - | 2 | 15 | 2 | 6 | 1 | 9 |
| Typhus (louse-borne) | D - | 1 | - | - | 1 | - | - | - | - | - | - | - | - | - | 1 | - | - | - | - |
| Rocky Mtn. Spotted Fever | C 1 | 3 | - | - | 2 | - | - | - | 1 | - | 1 | - | 1 | - | - | 1 | 2 | 1 | - |
| Q-Fever | D - | 1 | - | - | 2 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Other Rickettsial Diseases | C .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| Smallpox..... | D 1 | 2 | - | - | - | - | 1 | - | - | 2 | - | - | - | 1 | - | - | - | - | - |
| Tetanus..... | D 6 | - | 5 | 2 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Trichinosis | C .. | 16 | 8 | 9 | 9 | 13 | 25 | 22 | 14 | .. | 12 | 12 | 14 | 14 | 9 | 10 | 11 | 13 | 19 |
| Tularaemia..... | D 23 | 1 | 1 | 1 | 2 | 1 | 9 | 12 | 2 | 12 | 28 | 4 | 1 | 6 | 24 | 18 | 10 | 5 | 8 |
| Yellow Fever..... | D 3 | 7 | - | 1 | 4 | 4 | 2 | - | - | - | 9 | 5 | 17 | 2 | 1 | - | - | 3 | 1 |
| | D 6 | 3 | 1 | 1 | - | - | 14 | 14 | 2 | 11 | 6 | 1 | 4 | 4 | - | 3 | 7 | 8 | 4 |
| | D 1 | 3 | 1 | - | - | - | - | - | - | - | - | 1 | - | 1 | - | - | - | - | - |
| | D - | - | - | - | - | - | - | - | - | - | - | 1 | - | 1 | - | - | - | - | - |

¹ According to the list of notifiable diseases adopted by Dominion Council of Health, 1958 (See DBS: Annual Report of Notifiable Diseases 1961, p. 12).

² Based on DBS: Summary of Notifiable Diseases 1924-1952, Annual Reports of Notifiable Diseases, Causes of Death, 1950-60, Vital Statistics 1961, Preliminary Annual Report, and unpublished information made available by the Vital Statistics Section. For certain diseases the number of deaths indicate that at least an equal number of cases must have occurred in the same period. Appropriate corrections were made. Legend: .. not available, - no cases of deaths.

The regular reports of the World Health Organization reach promptly the health administrations in all member countries thus providing timely intelligence and enabling health departments everywhere to take the necessary action. This global epidemiological warning system has proved its worth here on a number of occasions such as the forewarning of the Asian influenza epidemics or a typhoid outbreak in a Swiss ski resort. As a result, steps could be taken to treat the individuals affected and to protect their actual or potential contacts. In describing smallpox control in Canada, Best and Davies¹ refer to the millions of Canadians vaccinated against the disease over the last ten years. While Asia, Africa, and South America are the major reservoirs of smallpox, during the two-year period from 1961 to 1963 there were ten separate importations of smallpox cases by aircraft into England, Germany, Sweden, Poland, and Canada; "the astonishing feature of these outbreaks was the number of cases and deaths of physicians and other health personnel".²

This history of one case of a disease like smallpox is a typical illustration of the impact of and services required by the infective and parasitic diseases. It leads to the following conclusions:

1. The effective control of many of these diseases is possible only with the closest cooperation of the international and the respective national health administrations.
2. The need for services in terms of personnel, facilities, and supplies is unpredictable making it necessary to have available at all times a pool of resources which can be drawn upon at short notice when and wherever required.
3. Unlike most other diseases where the impact is measured in terms of their frequency and the demand for services, even one single case of a disease like smallpox requires, possibly for a very limited time, a wide array and volume of services.
4. The infectious diseases, though largely controlled and reduced in their impact on our health, will remain a health problem as long as they are a problem in any part of the world. Even when generally controlled or eradicated, some continuing surveillance remains necessary.

The epidemiological and quarantine services designed to deal with these diseases must be evaluated largely not in terms of the occurrence of the diseases but in relation to their non-existence in Canada. Thus their need - as that of related services like food and drug control - is less obvious. But the example of the smallpox case illustrates their worth and the need for them; a hundred years ago this case would have led to an epidemic of unpredictable proportion with the resulting overwhelming loss of life and demand on services and facilities.

The six quarantinable diseases classified as such by the International Sanitary Regulations of the World Health Organization are: smallpox, cholera, plague, yellow fever, louse-borne typhus, and louse-borne relapsing fever. Because of their

¹ Best, E.W.R., and Davies, J.W., "Smallpox Control in Canada", *Canadian Medical Association Journal*, June 12, 1965, pp. 1247-1252.

² *Ibid.*, p. 1252.

high fatality rate and communicability they are sometimes referred to as the major quarantinable diseases, and occurrences like the cited smallpox case in Toronto emphasize the need for continued protection. Each case implies a potential threat of a major catastrophe even in Canada. An indication of the extent of the necessary surveillance network is given by the fact that in the fiscal year 1961-1962 over one million travellers (1,079,881) arriving in Canada were medically inspected and were either found to be in possession of International Certificates of Vaccination or were vaccinated on arrival.¹ In 918 cases follow-up procedures were instituted. Cholera also requires continuing watchfulness as long as there are epidemic outbreaks in areas from which travellers arrive in this country. Plague is regarded as a potential danger, as is yellow fever for those travelling to infected areas. Typhus and relapsing fever are endemic only in Africa but the presence of Canadians in the Congo and other areas renders these diseases also potentially dangerous.² The existing cases of leprosy and malaria are mostly imported from abroad. To deal with leprosy, leprosarium facilities existed both on the east and west coast. From the disease originally introduced into New Brunswick, 300 cases developed in that province but the case load gradually dwindled to the extent that the west coast facilities could be closed down. More effective treatment also reduced the number of patients treated at the remaining station to four, with 18 persons continuing as out-patients under surveillance of local medical officers of health across Canada. The only institution left is located at Tracadie, New Brunswick, and attached to the General Hospital operated by the religious hospitallers of the Hotel-Dieu de St. Joseph of Tracadie.³

Not only is it difficult to convince the public of the need for continuing effective control measures, it is also not easy to maintain a high standard of vigilance and alertness if seemingly nothing ever happens. The Canadian Medical Association observes that "the pendulum of medical opinion in fact has swung so far that many younger doctors genuinely believe that infectious diseases are no longer of significance in medicine and do not merit attention in either teaching or research".⁴

Other once widespread diseases have become rare also: "instead of being tragically commonplace in the experience of every practitioner, diphtheria and typhoid are now interesting rarities which a recently trained physician may never have seen".⁵ With a steady influx of immigrants and other travellers into the country some of the now rare parasitic diseases cannot be expected to remain outside Canada's borders. Indigenous cases do occur due to inadequate food preparation

¹ Department of National Health and Welfare, Annual Report for the fiscal year ended March 31, 1962, Ottawa: Queen's Printer, 1962.

² Ibid.

³ Ibid.

⁴ "Infectious Diseases in Modern Medicine", editorial, Canadian Medical Association Journal, Jan. 11, 1964, p. 85.

⁵ Ibid.

in the North.¹ In this respect too the Canadian Medical Association stresses the importance of "the education of our medical students and physicians" regarding these diseases.²

The group of rare diseases, insignificant as it now is in terms of the number of cases and deaths, and the volume of care they require, nevertheless constitutes a significant health problem because of the preventive measures needed and because of the treatment facilities required if unusual outbreaks do occur. Even diseases which have been non-existent in Canada for many decades present a potential health problem here as long as they exist anywhere in the world. In this age of easy and speedy travel, with more and more Canadians going abroad and people from other countries coming to Canada, quarantine and other public health measures become increasingly important even for conditions which are effectively controlled here. Even the "tropical" diseases "are no longer tropical but may appear in any corner of the globe".³

Tuberculosis

The status of tuberculosis and tuberculosis control has been the subject of a special study undertaken by Dr. G. J. Wherrett for the Royal Commission on Health Services.⁴ therefore, only the main trends will be outlined here.

Considerable progress has been made towards the control of tuberculosis which has lost much of its former dread as one of the major health problems in this country. So confident are Canada's health authorities of their ability to control tuberculosis that Canada was the first country to accept, under government responsibility, refugees with active tuberculosis.⁵ The success may be ascribed to a variety of factors including improved case finding and compulsory treatment, paid for largely out of public funds, more effective treatment methods, and improved living standards. One of the factors contributing to the decline of the disease is the previously mentioned effective control of bovine tuberculosis in Canada.

Table 18 and Figure 13 compare the decline since 1951 in mortality from the disease and in first admissions to hospitals.

Neither mortality nor first admission rates, however, tell the full story and other available indicators show varying trends. These are brought together in Table 19, and Figure 14 compares the index of the decline of mortality with that of the notification of newly discovered cases and the movement of patients in institutions. The spectacular decline in the death rate from 24.8 per 100,000 population in 1951 to 3.9 in 1963 is not entirely matched by the decline in the indicators of the incidence (the number of new cases). The index of readmissions to hospitals took a

¹ "Parasitic Diseases in Canada", editorial, Canadian Medical Association Journal, Aug. 29, 1964, pp. 446, 447.

² Ibid., p. 447.

³ Gilder, S.S.B., "The London Letter — Where Are You From, Stranger?", Canadian Medical Association Journal, April 13, 1963, p. 822.

⁴ Wherrett, G.J., *Tuberculosis in Canada*, a study prepared for the Royal Commission on Health Services, Ottawa: Queen's Printer, 1965.

⁵ This action was considered worthy of commemoration by a plaque in the entrance hall to the Parliament Buildings in Ottawa, inscribed by the office of the United Nations High Commissioner for Refugees.

TABLE 18
TUBERCULOSIS
RATES OF MORTALITY AND HOSPITAL FIRST ADMISSIONS, AND INDICES,
CANADA, 1951-1963

| Year | Deaths | | First Admissions | |
|-----------|---|--------------------------|---|--------------------------|
| | Rate per 100,000 Population ¹ | Per Cent of 1951 Rate | Rate per 100,000 Population ² | Per Cent of 1951 Rate |
| 1951..... | 24.8 | 100.0 | 66.2 | 100.0 |
| 1952..... | 17.6 | 71.0 | 66.3 | 100.2 |
| 1953..... | 12.5 | 50.4 | 65.1 | 98.3 |
| 1954..... | 10.4 | 41.9 | 62.3 | 94.1 |
| 1955..... | 8.9 | 35.9 | 63.4 | 95.8 |
| 1956..... | 7.8 | 31.5 | 56.5 | 85.3 |
| 1957..... | 7.1 | 28.6 | 56.0 | 84.6 |
| 1958..... | 6.0 | 24.2 | 48.3 | 73.0 |
| 1959..... | 5.5 | 22.2 | 41.2 | 62.2 |
| 1960..... | 4.6 | 18.5 | 37.9 | 57.3 |
| 1961..... | 4.2 | 16.9 | 31.6 | 47.7 |
| 1962..... | 4.2 | 16.9 | 29.6 | 44.7 |
| 1963..... | 3.9 | 15.7 | 26.6 | 40.2 |

¹ Dominion Bureau of Statistics, annual reports of Vital Statistics, Ottawa: Queen's Printer, various years.

² Dominion Bureau of Statistics, annual reports of Tuberculosis Statistics, Ottawa: Queen's Printer, various year.

sharp upward turn when the indices of death, infections, and first admissions declined. The readmission index in 1961 stood at a point only slightly below its 1951 level with a slight increase in 1961.¹ This is one dark spot in the otherwise bright picture of tuberculosis indicating that there are difficulties in ensuring the follow-through in modern drug treatment, and that the reservoir of tuberculosis in the community has changed but little over the last ten years. Where records have been kept of the number of active or inactive cases, they show little or no decline in the total number of cases under observation. All these cases still require follow-up procedures.² Only when reliable prevalence data become available, will the extent of the disease in the community be known. Prevalence surveys have been suggested by the World Health Organization³ and steps are being taken in Canada by all agencies concerned to obtain the relevant data from the tuberculosis registries in the provinces.

¹ By 1963, the rate of tuberculous readmissions had again declined to 13.5 per 100,000 population (Dominion Bureau of Statistics, Tuberculosis Statistics, Vol. I, Ottawa: Queen's Printer, 1965, p. 36).

² For example, in British Columbia the total known cases (active and inactive) of tuberculosis stood at 15,807 in 1953, and at 16,291 in 1962, with the maximum of 17, 995 cases reached in 1958. (Preliminary data made available by Dr. G. J. Wherrett.)

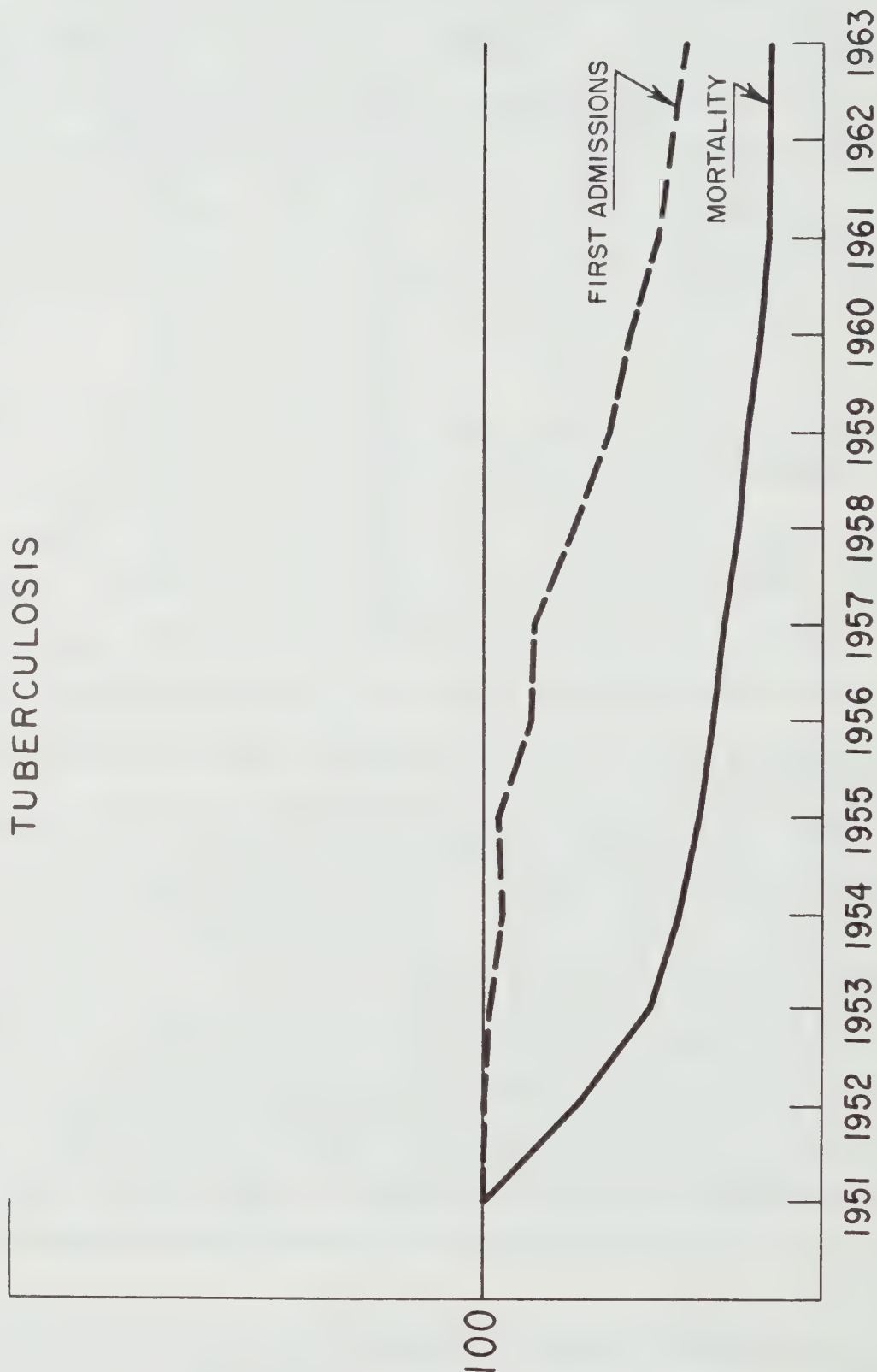
³ World Health Organization, "Expert Committee on Tuberculosis, Seventh Report", Technical Report Series No. 195, Geneva: The Organization, 1960, pp. 4-5.

FIGURE — 13

PERCENTAGE CHANGE IN RATES OF MORTALITY AND FIRST ADMISSIONS

1951-1963

TUBERCULOSIS



Source: Table 18.

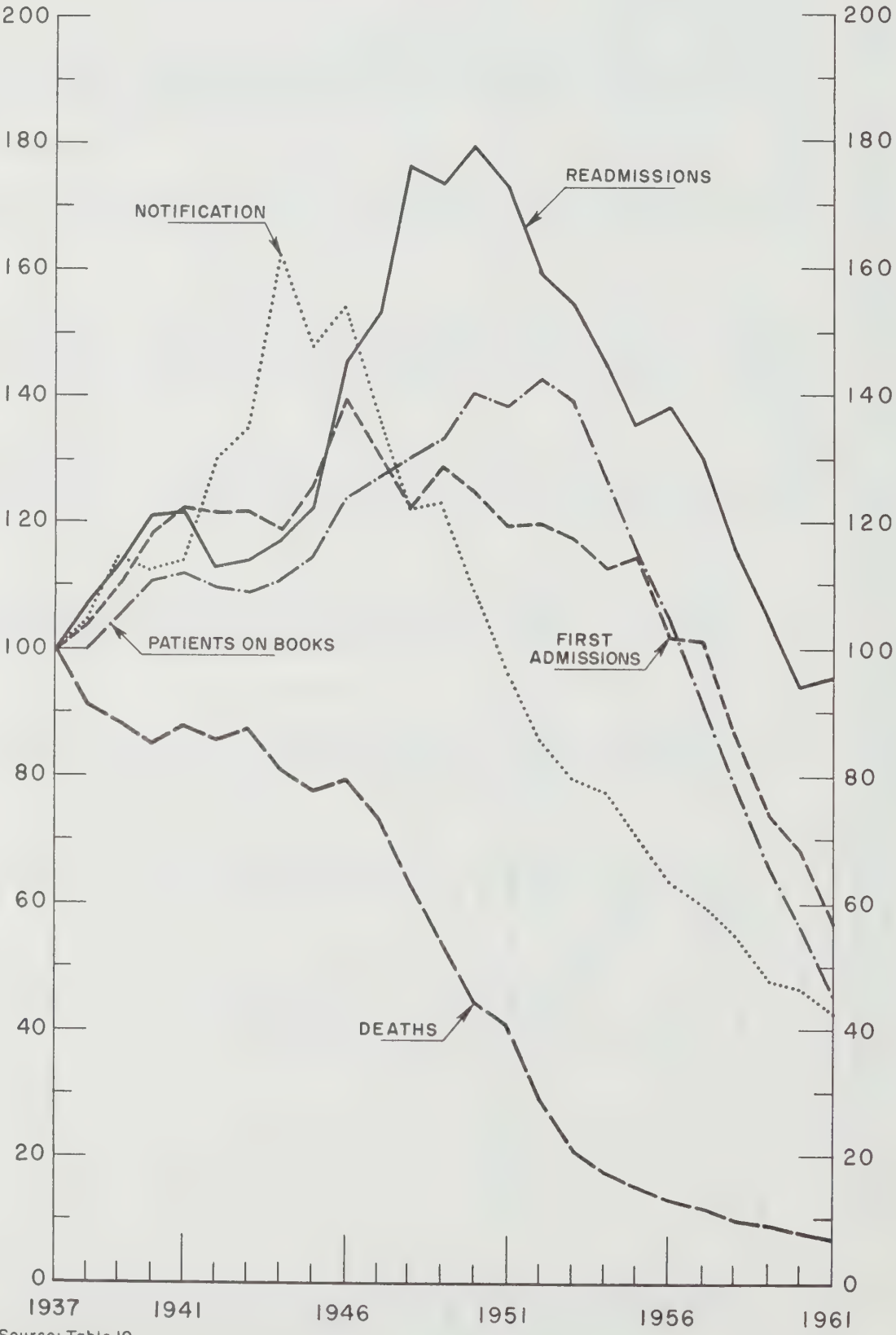
TABLE 19
TUBERCULOSIS TRENDS, CANADA, 1937-1961,
DEATHS, NOTIFICATIONS, FIRST ADMISSIONS, READMISSIONS AND PATIENTS ON BOOKS IN INSTITUTIONS,
RATES PER 100,000 POPULATION AND INDICES (1937 = 100.0)

| Year | Deaths | | Notifications | | Tuberculous First Admissions | | Readmissions | | Patients on Books | |
|-----------|--------|-------|---------------|-------|------------------------------|-------|--------------|-------|-------------------|-------|
| | Rate | Index | Rate | Index | Rate | Index | Rate | Index | Rate | Index |
| 1937..... | 60.9 | 100.0 | 77.4 | 100.0 | 55.5 | 100.0 | 18.3 | 100.0 | — | — |
| 1938..... | 55.3 | 90.8 | 81.0 | 104.7 | 57.5 | 103.6 | 19.5 | 106.6 | 77.8 | 100.0 |
| 1939..... | 53.6 | 88.0 | 88.4 | 114.2 | 61.0 | 109.9 | 20.7 | 113.1 | 82.4 | 105.9 |
| 1940..... | 51.4 | 84.4 | 86.6 | 111.9 | 65.5 | 118.0 | 22.1 | 120.8 | 86.0 | 110.5 |
| 1941..... | 53.5 | 87.8 | 88.0 | 113.7 | 67.5 | 121.6 | 22.2 | 121.3 | 86.8 | 111.6 |
| 1942..... | 52.0 | 85.4 | 100.6 | 130.0 | 67.2 | 121.1 | 20.6 | 112.6 | 85.4 | 109.8 |
| 1943..... | 53.1 | 87.2 | 104.5 | 135.0 | 67.4 | 121.4 | 20.8 | 113.7 | 84.8 | 109.0 |
| 1944..... | 49.0 | 80.5 | 125.3 | 161.9 | 66.0 | 118.9 | 21.4 | 116.9 | 85.9 | 110.4 |
| 1945..... | 47.2 | 77.5 | 113.9 | 147.2 | 69.7 | 125.6 | 22.3 | 121.9 | 88.9 | 114.3 |
| 1946..... | 48.3 | 79.3 | 119.1 | 153.9 | 77.2 | 139.1 | 26.6 | 145.4 | 95.9 | 123.3 |
| 1947..... | 44.4 | 72.9 | 105.7 | 136.6 | 69.9 | 125.9 | 28.0 | 153.0 | 99.0 | 127.2 |
| 1948..... | 38.1 | 62.6 | 93.9 | 121.3 | 67.7 | 122.0 | 32.3 | 176.5 | 101.2 | 130.1 |
| 1949..... | 32.6 | 53.5 | 94.8 | 122.5 | 71.4 | 128.6 | 31.7 | 173.2 | 104.0 | 133.7 |
| 1950..... | 26.8 | 44.0 | 84.5 | 109.2 | 69.0 | 124.3 | 32.8 | 179.2 | 109.1 | 140.2 |
| 1951..... | 24.8 | 40.7 | 74.3 | 96.0 | 66.2 | 119.3 | 31.6 | 172.7 | 107.9 | 138.7 |
| 1952..... | 17.6 | 28.9 | 66.1 | 85.4 | 66.3 | 119.5 | 29.2 | 159.6 | 111.1 | 142.8 |
| 1953..... | 12.5 | 20.5 | 61.7 | 79.7 | 65.1 | 117.3 | 28.3 | 154.6 | 108.2 | 139.1 |
| 1954..... | 10.4 | 17.1 | 59.8 | 77.3 | 62.3 | 112.3 | 26.5 | 144.8 | 99.6 | 128.0 |
| 1955..... | 8.9 | 14.6 | 54.6 | 70.5 | 63.4 | 114.2 | 24.8 | 135.5 | 90.2 | 115.9 |
| 1956..... | 7.8 | 12.8 | 49.4 | 63.8 | 56.5 | 101.8 | 25.3 | 138.3 | 81.3 | 104.5 |
| 1957..... | 7.1 | 11.7 | 46.2 | 59.7 | 56.0 | 100.9 | 23.8 | 130.1 | 70.4 | 90.5 |
| 1958..... | 6.0 | 9.8 | 42.4 | 54.8 | 48.3 | 87.0 | 21.2 | 115.8 | 61.2 | 78.7 |
| 1959..... | 5.5 | 9.0 | 37.0 | 47.8 | 41.2 | 74.2 | 19.2 | 104.9 | 51.4 | 66.1 |
| 1960..... | 4.6 | 7.6 | 35.7 | 46.1 | 37.9 | 68.3 | 17.2 | 94.0 | 43.6 | 56.0 |
| 1961..... | 4.2 | 6.9 | 32.7 | 42.2 | 31.6 | 56.9 | 17.4 | 95.1 | 35.0 | 45.0 |

Source: Dominion Bureau of Statistics, Tuberculosis Statistics 1960, Ottawa: Queen's Printer, 1962, and unpublished figures for 1961.

FIGURE — 14

TUBERCULOSIS TRENDS, CANADA, 1937-1961,
INDICES OF DEATHS, NOTIFICATIONS, FIRST ADMISSIONS,
READMISSIONS AND PATIENTS ON BOOKS IN INSTITUTIONS,
(1937=100.0)



Source: Table 19

In 1959 Canada's death rate from tuberculosis of 5.5 per 100,000 compared with the following rates in the selected other countries:¹

| | |
|-------------------------|------|
| United States..... | 6.5 |
| England and Wales | 8.5 |
| France | 23.2 |
| Sweden | 7.2 |
| Mexico | 29.0 |
| Ceylon | 19.2 |

Poliomyelitis

Poliomyelitis used to be looked upon as one of Canada's main health problems. Unlike tuberculosis, which is in most areas an endemic disease² and subject to fairly steady trends, poliomyelitis was feared for its periodic epidemic flare-ups, often concentrated in certain regions so that the national figures of incidence and mortality do not entirely reflect the seriousness of these outbreaks. The advent of the vaccines and particularly the effective vaccination programme set into motion and maintained during the last decade have greatly reduced the threat from this disease, as shown in Table 20. It must be remembered though that the present situation can be maintained and possibly further improved only

TABLE 20
POLIOMYELITIS, Cases and Deaths, Canada, 1951 - 1962

| Year | Cases | Deaths |
|-----------|-------|--------|
| 1951..... | 1,248 | 162 |
| 1952..... | 1,595 | 311 |
| 1953..... | 3,912 | 494 |
| 1954..... | 1,456 | 157 |
| 1955..... | 584 | 36 |
| 1956..... | 404 | 51 |
| 1957..... | 185 | 26 |
| 1958..... | 249 | 26 |
| 1959..... | 1,887 | 182 |
| 1960..... | 909 | 83 |
| 1961..... | 188 | 11 |
| 1962..... | 89 | 17 |

Source: Dominion Bureau of Statistics, annual reports of Notifiable Diseases, and Vital Statistics, Ottawa: Queen's Printer, various years.

¹ World Health Organization, Annual Epidemiological and Vital Statistics 1959, Geneva: The Organization, 1962.

² The amount of the disease usually present in the community.

by continuing the extensive immunization programme, especially since the low incidence reduces the extent of natural immunity.

Diphtheria

The effects of immunization against diphtheria have been evident for many years, but unnecessary cases and deaths still occur which could be avoided by the universal application of immunization.

TABLE 21
DIPHTHERIA, Cases and Deaths, Canada, 1942 - 1962

| Year | Cases | Deaths |
|------------|-------|--------|
| 1942 | 2,955 | 256 |
| 1943 | 2,804 | 287 |
| 1944 | 3,223 | 309 |
| 1945 | 2,786 | 271 |
| 1946 | 2,535 | 227 |
| 1947 | 1,550 | 140 |
| 1948 | 898 | 86 |
| 1949 | 806 | 84 |
| 1950 | 421 | 52 |
| 1951 | 253 | 37 |
| 1952 | 190 | 26 |
| 1953 | 132 | 15 |
| 1954 | 208 | 18 |
| 1955 | 139 | 15 |
| 1956 | 135 | 8 |
| 1957 | 142 | 20 |
| 1958 | 66 | 7 |
| 1959 | 37 | — |
| 1960 | 53 | 7 |
| 1961 | 93 | 5 |
| 1962 | 71 | 9 |

Source: Dominion Bureau of Statistics, annual reports of Notifiable Diseases, and Vital Statistics, Ottawa: Queen's Printer, various years.

Whooping Cough (Pertussis)

Though the reliability of diagnosis as well as the efficacy of the vaccine may be lower in the case of whooping cough than they are for diphtheria, a similar situation prevails: immunization has reduced the problem but it still continues to cause a number of deaths every year.

TABLE 22
PERTUSSIS, Cases and Deaths, Canada, 1952 - 1962

| Year | Cases | Deaths |
|------------|--------|--------|
| 1952 | 8,520 | 148 |
| 1953 | 9,387 | 134 |
| 1954 | 11,600 | 96 |
| 1955 | 13,683 | 137 |
| 1956 | 8,513 | 118 |
| 1957 | 7,459 | 63 |
| 1958 | 6,932 | 40 |
| 1959 | 7,259 | 46 |
| 1960 | 5,992 | 71 |
| 1961 | 5,478 | 36 |
| 1962 | 8,076 | 24 |

Source: Dominion Bureau of Statistics, annual reports of Notifiable Diseases, and Vital Statistics, Ottawa: Queen's Printer, various years.

Remaining Problems, Old and New

While many of the former scourges among the infective and parasitic diseases have been curbed, there seems to be some truth in William Farr's claim that when one weed in the garden is controlled, others will take its place.¹ The successes of "sulfa drugs" and antibiotics are sometimes followed by resistance to these drugs. New forms of staphylococci and viruses develop or are discovered, and the impact of the viruses is still not fully known.

Some of the older diseases still rise occasionally above the endemic level. In assessing the data, one has to remember that the statistics for Canada as a whole are apt to obscure the seriousness of some local occurrences: for instance, 20 cases of a disease during the year may be few in relation to the population and size of the country but if the 20 cases occur in one locality they may represent a very serious outbreak.

Noteworthy among the diseases in this problem group, besides those already mentioned, are the venereal diseases which are a continuing problem, infectious hepatitis which is a growing and perplexing public health threat, and the hospital infections which, however, have come under closer surveillance in recent years.

Venereal Diseases

The venereal diseases are a group where the means of prevention as well as cure are known and available, and yet these diseases continue to be a problem

¹ Farr, W., Vital Statistics, London: E. Stanford 1885, p. 313.

not because of the lack of medical knowledge or adequate health services but because of social conditions whose remedy seems to lie entirely in the field of education. The rising incidence during the last few years has been a cause of great concern to those dealing with the health and social issues involved.

Mortality from syphilis is due to its late effects, and therefore the deaths of today are the result of the new cases of previous years. Because of this time lag it is difficult to establish the relationship of deaths and new cases in the same year. The slowly declining number of deaths, however, may be ascribed to more effective treatment methods which help to keep the mortality down even in the face of an increasing incidence.

TABLE 23
VENEREAL DISEASES,
CASES , DEATHS, AND RATES PER 100,000 POPULATION, CANADA, 1952-1962

| Year | Primary Syphilis | | Gonorrhoea ¹ | | Deaths from Syphilis and Sequelae | |
|-----------|------------------|-------|-------------------------|-------|-----------------------------------|-------|
| | Cases | Rates | Cases | Rates | Number | Rates |
| 1952..... | 347 | 2.4 | 14,411 | 99.7 | 297 | 2.1 |
| 1953..... | 202 | 1.4 | 15,496 | 104.4 | 283 | 1.9 |
| 1954..... | 157 | 1.0 | 15,472 | 101.2 | 179 | 1.2 |
| 1955..... | 131 | 0.8 | 14,295 | 91.1 | 187 | 1.2 |
| 1956..... | 116 | 0.7 | 14,545 | 90.4 | 209 | 1.3 |
| 1957..... | 146 | 0.9 | 14,312 | 86.2 | 190 | 1.1 |
| 1958..... | 123 | 0.7 | 15,037 | 88.0 | 177 | 1.0 |
| 1959..... | 226 | 1.3 | 14,821 | 84.8 | 167 | 1.0 |
| 1960..... | 266 | 1.5 | 15,659 | 87.6 | 172 | 1.0 |
| 1961..... | 337 | 1.8 | 16,453 | 90.2 | 160 | 0.9 |
| 1962..... | 546 | 1.9 | 17,684 | 95.2 | 129 | 0.8 |

¹ Except ophthalmia neonatorum (13 cases in 1962).
Source: Based on Dominion Bureau of Statistics, annual reports of Notifiable Diseases, and Vital Statistics, Ottawa: Queen's Printer, various years.

A growing problem, and one which alarmed the United States Task Force to the Surgeon General on syphilis,¹ is the spread of venereal diseases among teenagers.

The age distribution of reported venereal disease cases in eight of Canada's provinces was as follows in 1962:

¹ United States Public Health Service, "The Eradication of Syphilis, A Task Force Report to the Surgeon General", Public Health Service Publication No. 918, Washington: U.S. Government Printing Office, 1962, p. 5.

Reported Cases of Venereal Disease and Percentages,
By Age and Sex, Eight Provinces,¹ 1962

| Age | Syphilis | | | | | | Gonorrhoea | | | |
|------------------|----------|----------|--------|----------|-------|----------|------------|----------|--------|---------------|
| | Primary | | | Other | | | | | | |
| | Male | | Female | | Male | | Female | | Male | |
| | Cases | Per Cent | Cases | Per Cent | Cases | Per Cent | Cases | Per Cent | Cases | Per Cent |
| Under 1..... | -- | | -- | | 7 | 0.6 | 1 | 0.1 | 5 | 3 } 0.2 |
| 1 - 4..... | -- | | -- | | -- | | 1 | 0.1 | 1 | 7 } 0.3 |
| 5 - 9..... | -- | | -- | | 2 | 0.2 | 2 | 0.3 | 1 | 14 } 1.9 |
| 10 - 14..... | 1 | 0.3 | 1 | 1.2 | 1 | 0.1 | 8 | 1.1 | 6 | 93 } 30.7 |
| 15 - 19..... | 23 | 5.3 | 10 | 11.2 | 40 | 3.7 | 52 | 7.0 | 924 | 1,511 } 57.2 |
| 20 - 39..... | 306 | 70.8 | 55 | 61.8 | 360 | 33.1 | 279 | 37.6 | 8,681 | 2,815 } 5.9 |
| 40 - 59..... | 78 | 18.0 | 19 | 21.3 | 320 | 29.4 | 219 | 29.5 | 1,043 | 290 } 0.3 |
| 60 and over..... | 9 | 2.1 | -- | | 267 | 24.5 | 112 | 15.1 | 84 | 16 } 3.5 |
| Not stated..... | 15 | 3.5 | 4 | 4.5 | 91 | 8.4 | 68 | 9.2 | 998 | 171 } |
| Total | 432 | 100.0 | 89 | 100.0 | 1,088 | 100.0 | 742 | 100.0 | 11,743 | 4,920 } 100.0 |

¹ Sex not stated in 434 cases of gonorrhoea and 22 cases of syphilis.
Source: Dominion Bureau of Statistics, Annual Report of Notifiable Diseases, 1962, Ottawa: Queen's Printer, 1963, p. 59.

The proportion of cases of primary syphilis and gonorrhoea among teenagers is higher among girls. Among them the higher concentration of cases is found at younger ages than it is among boys. About one-third of the reported gonorrhoea cases among women are in the age group below 20. How indicative these figures are of the real situation is difficult to judge, because we do not know what bias may be introduced by the under-reporting of venereal disease to the health authorities. A survey among physicians in New York City revealed that of the cases they had treated over 20 per cent were among people under the age of 20.¹

The same survey also investigated the extent to which cases of venereal disease are not reported to the health authorities by the attending physician. In New York City it was found that "not more than 60 per cent of the cases of primary and secondary syphilis and not more than 35 per cent of the cases of gonorrhoea treated by physicians in solo practice are actually reported by them to the Health Department".² For the United States as a whole, it has been estimated that the actual number of cases of gonorrhoea is perhaps from five to ten times the official figure;³ and another survey showed only 11 per cent of syphilis cases reported in the United States.⁴

The sense of security derived from the effectiveness and speed of penicillin treatment may be a factor in the neglect of prevention but late effects, including congenital infection, still occur. The above-mentioned Task Force in the United States concludes its report with the plea 'for a worldwide eradication programme under the auspices of the World Health Association, without which no state or nation can be secure in its efforts to control syphilis⁵ and, one may add, all venereal disease.

Infectious Hepatitis

Table 24, showing the number of cases reported each year, illustrates the growing seriousness of the problem.

Chickenpox, Measles, Mumps, German Measles (Rubella)

Physicians are no longer required to report cases of these diseases to health authorities because they no longer constitute a major public health problem, and also because the reporting had been so incomplete that the resulting statistics were useless. The four diseases, often referred to as the minor childhood diseases, are considered to be part of the growing-up process. There is no adequate method

¹ Gelman, A.C., et al., "Current Status of Venereal Disease in New York City: a Survey of 6,649 Physicians in Solo Practice", *American Journal of Public Health*, December 1963, p. 1917.

² Ibid.

³ "Gonorrhoea — Still an Important Disease!", editorial, *American Journal of Public Health*, December 1961, p. 1894.

⁴ "The VD Situation Today", editorial, *American Journal of Public Health*, November 1963, p. 1836.

⁵ United States Public Health Service, *The Eradication of Syphilis*, op. cit., p. 30.

of prevention, and quarantine is not enforced. Among children the cases are usually light and recovery is quick, but in later life, particularly during pregnancy, these diseases may cause severe illness or complications.

TABLE 24
INFECTIOUS HEPATITIS,
CASES REPORTED, AND RATES PER 100,000 POPULATION, CANADA, 1952-1962

| Year | Cases | Rates |
|-----------|--------|-------|
| 1952..... | 2,392 | 16.5 |
| 1953..... | 3,268 | 22.0 |
| 1954..... | 4,567 | 29.9 |
| 1955..... | 3,885 | 24.7 |
| 1956..... | 2,937 | 18.3 |
| 1957..... | 3,006 | 18.1 |
| 1958..... | 4,515 | 26.4 |
| 1959..... | 4,728 | 27.0 |
| 1960..... | 6,314 | 35.3 |
| 1961..... | 12,237 | 67.1 |
| 1962..... | 12,538 | 67.5 |

Based on Dominion Bureau of Statistics, Infectious Hepatitis, 1961, and annual reports of Notifiable Diseases, Ottawa: Queen's Printer, various years.

Yet there are still deaths from measles, due mostly to complicating pneumonia, and there are also some deaths even from the usually harmless chickenpox, mumps, and German measles.

Although these diseases may not be considered an important public health problem, they account for a sizeable proportion of illness among children and of their health care.

According to the Canadian Sickness Survey, 1950-51,¹ these four diseases were responsible for some 11 million days of disability corresponding to some 16 million days of disability in the larger population in 1961. This is about 7 per cent of all disability reported in the Survey and 63 per cent of the disability due to the entire group of infective and parasitic diseases. It amounts to about one-quarter of disability from all causes among children under 15, and to about one-tenth of all school absenteeism from Grade I to Grade XIII.²

¹ Department of National Health and Welfare and Dominion Bureau of Statistics, "Illness and Health Care in Canada", Canadian Sickness Survey, 1950-51, Ottawa: Queen's Printer, 1960.

² The National Committee for School Health Research, Absenteeism in Canadian Schools, Report No. 3, Toronto, 1948.

TABLE 25
DEATHS FROM
MEASLES, CHICKENPOX, MUMPS, GERMAN MEASLES,
CANADA, 1952-1963

| | 1952 | 1953 | 1954 | 1955 | 1956 | 1957 | 1958 | 1959 | 1960 | 1961 | 1962 | 1963 |
|---------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Measles | 256 | 140 | 120 | 179 | 177 | 108 | 93 | 84 | 53 | 96 | 81 | 73 |
| Without mention of pneumonia . . . | 87 | 62 | 40 | 56 | 72 | 46 | 34 | 41 | 19 | 38 | 40 | 24 |
| With pneumonia . | 168 | 78 | 79 | 118 | 102 | 60 | 59 | 43 | 34 | 58 | 41 | 49 |
| Late effects | 1 | — | 1 | 5 | 3 | 2 | — | — | — | — | — | — |
| Chickenpox | 25 | 22 | 15 | 13 | 19 | 29 | 35 | 17 | 29 | 26 | 19 | 19 |
| Mumps | 11 | 8 | 10 | 7 | 10 | 9 | 4 | 4 | 5 | 5 | 5 | 4 |
| German Measles . . . | 2 | — | 1 | 3 | 5 | 3 | 2 | — | — | 5 | 6 | 3 |

Source: Dominion Bureau of Statistics, "Causes of Death, 1950-60", p. 7, and annual reports of Vital Statistics, Ottawa: Queen's Printer, various years.

Review

The successful gradual control of such diseases as smallpox, diphtheria, tuberculosis, poliomyelitis, and whooping cough has reduced this group of diseases from its position as the outstanding health problem to one taking second place to the chronic diseases and accidents. This development has brought about an extension of public health methods which originated as a defence against the epidemics of old. The defence, however, still has to be maintained. The venereal diseases thought to be controlled after the intensive campaigns during and after the last war, show signs of resurgence though their fatality has been reduced. Infectious hepatitis is an increasing problem as is the wide and largely uncharted field of viruses in general. Thus, the infective diseases are far from being eliminated as a serious health problem.

What we have achieved, however, is the control of the most fatal of these diseases. Their fatal effect has been reduced to the extent that they no longer exact the toll in human lives that they did when epidemics laid waste the cities and towns of Europe, and more recently when tuberculosis and the other communicable diseases were among the leading causes of death.¹ The success achieved should not be allowed to obscure the fact that the control measures must be continued, and intensified in some instances, if we are to continue to control these diseases effectively in the future. One case of smallpox suddenly turning up at the Toronto airport stands as a reminder of what we owe to effective preventive services.²

¹ Poliomyelitis and influenza are the causes of more recent outbreaks of epidemic proportions accompanied by substantially increased mortality. Poliomyelitis still caused 494 deaths in 1953 (11 in 1961). No accurate figures are available on the deaths caused by the influenza epidemic following World War I but data supplied by the Dominion Bureau of Statistics point to an excessive number of deaths of the order of about 25,000 annually during the period from 1918 to 1920. In 1959, the Asian influenza epidemic resulted in an excess of about 600 deaths from influenza during that year.

² Another dramatic example is the outbreak of typhoid fever in Aberdeen in June 1964, caused by a faulty can of corned beef imported from overseas.

The reference to the threat to the community from one case of smallpox is merely an illustration of the painstaking extensive intelligence work which has to be carried out continuously by health authorities internationally, nationally, and interprovincially in addition to the provision of actual preventive, diagnostic, and treatment service. To a greater or lesser extent the problem of tracing the source of infection and possible contacts is common to all infectious diseases and many other examples could be cited, for instance, from the field of venereal disease control, tuberculosis, or typhoid fever where the problem is not only the overt case but also the "silent carrier" whose detection frequently offers all the thrills of a real detective story.¹

The spectacular successes registered in the control of infectious diseases easily lead to unwarranted complacency not only in the organization of our health services, but an equally or even more dangerous neglect of this field in medical education.

Tager takes issue with the "attitude that infectious disease constitutes a field of diminishing clinical importance", a judgment "which takes at face value the dramatic decline in the incidence and the risk of so many of the major infectious diseases, occurring wherever established knowledge has been effectively applied".² He aptly summarizes the situation as follows:

"However, the notion is far off the mark that the field of infectious diseases is in the doldrums, and that current needs require only a marginal holding operation. Those of us directly engaged in patient care know all too well that nothing can be further from the truth. Those of us concerned with basic aspects of infectious disease also need no convincing that actually we are caught up in a period of rapid change and expansion of scientific knowledge. If anything, the field of infectious disease has become more sophisticated and demanding in both theory and practice.

In spite of the spectacular progress achieved in the control of so many of the major infectious diseases, it has been estimated that in some representative medical centers as many as 20 to 30 per cent of the patients have infectious disease problems. There is no shortage of chronic infection, as of the urinary or the respiratory tracts, in which autogenous microorganisms play a major role. Both acute and chronic infections may complicate chronic disease, be it of neoplastic, metabolic, cardio-vascular, renal, respiratory or post-surgical origin. In many centers, staphylococci and gram negative bacteria have assumed outstanding importance. Many microorganisms formerly not seriously considered as pathogens have proven their disease-producing potential, and many newly appreciated etiological agents are encountered."³

Frappier has related the continuing importance of contagious disease to the living pattern of modern Canadian society:

"Far from contemplating the end of infectious diseases, our modern civilization is now witnessing the emergence of new and uncanny infections . . .

"Naturally or artificially induced changes in the pathogenic flora, purification of and

¹ See, for instance, Skoll, S.L., Dillenberg, H., "Typhoid Carrier — The Case of Grandma C", *Canadian Journal of Public Health*, August 1962, pp. 333 and 334, and "Typhoid Fever: A Saskatchewan Saga", *Canadian Medical Journal*, August 25, 1962, pp. 397-404.

² Tager, M., "Some General Perspectives on Infectious Disease", *Journal of Medical Education*, September 1964, p. 5.

³ *Ibid.*, p. 6.

changes occurring in the biosphere, easy living conditions which lower physiological, mental and physical fitness, create new grounds where the old well-known infections can establish themselves if the standards of preventive measures are neglected, and where other unsuspected or unexpected bacterial and viral agents will find conditions favourable to their development.”¹

Statistical Summary

Mean Age at Death from Infective and Parasitic Diseases:

During the period from 1951 to 1961, when the mean age at death from all causes had risen from 57.3 to 61.0 (a rise of 6.5 per cent), the corresponding figures for deaths from infective and parasitic diseases were:²

| | 1951 | 1961 | Per Cent Increase |
|------------|------|------|-------------------|
| Both sexes | 36.7 | 45.6 | 24.3 |
| Male | 39.8 | 47.6 | 19.6 |
| Female | 32.1 | 42.2 | 31.5 |

Incidence and Prevalence of Infective and Parasitic Diseases:³

| | Persons Developing New Illness during Year per 100,000 Population | Persons Sick Any Day per 100,000 Population |
|---|--|--|
| All Infective and Parasitic Diseases, | 9,910 | 740 |
| Scarlet fever, strept. sore throat, erysipelas, septicaemia, pyaemia | 730 | 30 |
| Whooping Cough | 680 | 80 |
| Other bacterial diseases | 540 | 170 |
| Measles | 3,420 | 110 |
| German Measles | 550 | 10 |
| Chickenpox | 1,940 | 70 |
| Mumps | 2,060 | 70 |
| Infestations with worms | 520 | 100 |
| Fungus and arthropod diseases | 390 | 60 |
| Other infective and parasitic diseases .. | 530 | 60 |

¹ Frappier, A., "The Prevention of Illness", Canadian Journal of Public Health, January 1963, pp. 1 and 2.

² These and the following mean ages at deaths in 1951 and 1961 were specially tabulated and very kindly supplied by the Vital Statistics Division of the Dominion Bureau of Statistics.

³ Department of National Health and Welfare and Dominion Bureau of Statistics, op. cit., pp. 106 and 109 (these are estimates based on a sample survey of households by interviews).

Infective and Parasitic Diseases in Canada and Selected Other Countries:

The death rate per 100,000 population from these diseases in 1959 shows that Canada compares favourably with certain other countries selected for this comparison:¹

| | |
|-------------------|-------|
| Canada | 10.8 |
| United States | 12.8 |
| England and Wales | 13.7 |
| France | 32.6 |
| Sweden | 10.9 |
| Mexico | 171.1 |
| Ceylon | 73.8 |

Tuberculosis is among the diseases causing the higher rates in other countries with a comparable standard of living and health services.² Compared with some of the developing countries, Canada's low rate is due to her effective control of environmental hazards which would favour the spread of communicable diseases, and to some extent to the climate which is not conducive to the vectors of some of the diseases which are causing the high rates in countries like Mexico and Ceylon.

Infective and Parasitic Diseases and Their Share of Total Illness and Health Care:

In order to obtain some measure of the impact of certain disease groups relative to others, estimates are presented in the following chapter showing the total estimated volume of mortality, certain aspects of morbidity, and personal health services. These totals were then broken down to show the respective estimated percentages of the total accounted for by each disease group. These percentages are repeated at the end of the discussion of each group so that an approximate idea of their relative standing can be obtained in this context.

Mortality from the infective and parasitic diseases -whether measured in absolute numbers or in terms of life years lost -has been reduced to a point where they account for less than 2 per cent of the mortality from all causes. They now rank eleventh in terms of the number of deaths and ninth in regard to life years lost, a far cry from the second place (after the diseases of the circulatory system) they occupied in 1924.

Nevertheless, this group ranks third as a cause of disability and hospitalization, the latter due largely to the need for hospitalization by tuberculosis patients. While it ranks only ninth in terms of the demand for physicians' services (accounting for 5.4 per cent of the total), this group of diseases requires for its continuing control a substantial part of the preventive and other public health services such

¹ Here and in similar comparisons in subsequent sections the United States, England and Wales, France, and Sweden were selected as countries with similar socio-economic conditions. Mexico and Ceylon are added as examples of developing countries, for which data are available, the former as a country in the Americas, the latter as an Asian country.

² The death rate from tuberculosis was as follows in 1959: Canada 5.5, United States 6.5, England and Wales 8.5, France 23.2, Sweden 7.2. Based on World Health Organization, op. cit., pp. 288-290.

as quarantine, case finding and follow up, which are not reflected in the percentage figures given below. This group accounted for the following percentages of total illness and demand for selected health services:

| | <u>Per Cent</u> |
|-----------------------|-----------------|
| All deaths | 1.2 |
| Premature mortality | 1.8 |
| Disabling illness | 9.5 |
| Non-disabling illness | 3.0 |
| Hospital separations | 1.5 |
| Hospital days | 6.1 |
| Physicians' services | 5.4 |
| Prescriptions | 0.5 |
| Home nursing | 1.8 |

NEOPLASMS

This group of diseases includes the malignant neoplasms, i.e., cancer, and the benign neoplasms (including non-malignant tumours, cysts, etc.) and those neoplasms which are unspecified as to their nature.

Table 26 and Figure 15 show that illness from these diseases as reflected in the number of hospital separations has been increasing slightly but steadily, and that the mortality rate has remained at almost exactly the same level till 1962, when an upward swing begins. The malignant neoplasms, as the name implies, are the deadly ones in this class. Less than 2 per cent of the deaths are ascribed to what would appear to be complications of normally benign neoplasms.

The death rate from benign neoplasms has remained low and fairly constant with a small decline during the most recent years (Table 27). On the other hand, these neoplasms account for about one-half of the hospital cases in this class. Their rate of hospitalization has remained fairly constant. The increase in the rate of hospitalization for all neoplasms is thus due to the malignant ones.

Cancer (Malignant Neoplasms)

There are few diseases of which we know so little, whether it be their prevention or their cure, as we do of cancer.

The mortality rates shown for all forms of cancer hide different and even diverging trends as shown by malignancies of specific sites and among specific groups of people.¹

¹ While we know how many persons die from cancer year by year, regrettably we have no statistics showing how many people suffer from cancer in this country, how many new cases occur or are found, and the trend over a number of years. Cancer shares this deplorable lack of adequate statistics with all our other major health problems, a fact which is difficult to reconcile with the advanced techniques at our disposal for data collection and processing.

TABLE 26
NEOPLASMS,
RATES OF MORTALITY AND HOSPITAL SEPARATIONS, AND INDICES,
CANADA, 1951-1963

| Year | Deaths | | Hospital Separations | |
|-----------|--|-----------------------|--|-----------------------|
| | Rate per 100,000 Population ¹ | Per Cent of 1951 Rate | Rate per 100,000 Population ² | Per Cent of 1951 Rate |
| 1951..... | 129.5 | 100.0 | 838 | 100.0 |
| 1952..... | 131.3 | 101.4 | 875 | 104.4 |
| 1953..... | 131.4 | 101.5 | 853 | 101.8 |
| 1954..... | 131.3 | 101.4 | 883 | 105.4 |
| 1955..... | 131.7 | 101.7 | 928 | 110.7 |
| 1956..... | 132.0 | 101.9 | 970 | 115.8 |
| 1957..... | 130.9 | 101.1 | 964 | 115.0 |
| 1958..... | 129.3 | 99.8 | 965 | 115.2 |
| 1959..... | 129.1 | 99.7 | 970 | 115.8 |
| 1960..... | 131.8 | 101.8 | 990 | 118.1 |
| 1961..... | 131.4 | 101.5 | 1,010 | 120.5 |
| 1962..... | 134.0 | 103.5 | 980 | 116.9 |
| 1963..... | 134.6 | 103.9 | 1,000 | 119.3 |

¹ Dominion Bureau of Statistics, annual reports of Vital Statistics, Ottawa: Queen's Printer, various years.

² Department of Public Health, annual reports of Saskatchewan Hospital Services Plan, Regina: Queen's Printer, various years.

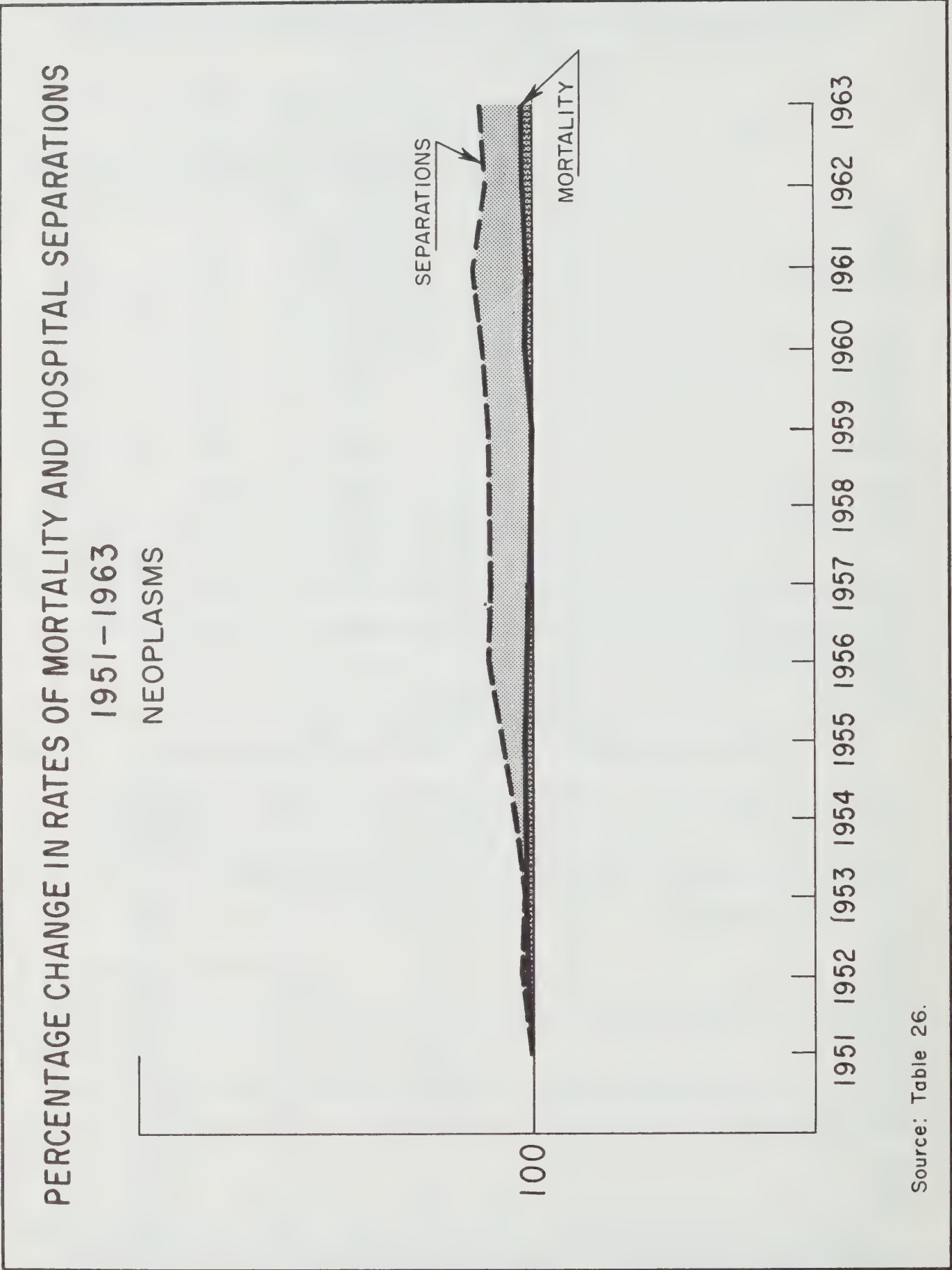
TABLE 27
BENIGN NEOPLASMS, 1951 - 1963

| Year | Death Rate per 100,000 Population ¹ | Hospital Separations per 100,000 Population ² |
|-----------|--|--|
| 1951..... | 2.2 | 420 |
| 1952..... | 2.6 | 457 |
| 1953..... | 2.7 | 438 |
| 1954..... | 2.4 | 449 |
| 1955..... | 2.3 | 457 |
| 1956..... | 2.2 | 473 |
| 1957..... | 2.1 | 458 |
| 1958..... | 1.7 | 453 |
| 1959..... | 1.9 | 440 |
| 1960..... | 1.7 | 430 |
| 1961..... | 1.7 | 450 |
| 1962..... | 1.9 | 430 |
| 1963..... | 1.9 | 480 |

¹ Dominion Bureau of Statistics, annual reports of Vital Statistics, Ottawa: Queen's Printer, various years.

² Department of Public Health, annual reports of Saskatchewan Hospital Services Plan, Regina: Queen's Printer, various years.

FIGURE — 15



According to Table 28 and Figure 15A, during the period from 1951 to 1963, the mortality rate from all malignant neoplasms changed but little. In 1951 it stood at 127.3 per 100,000 population and after some minor fluctuations rose to 129.7 in 1961, a percentage increase of 1.9. There has been an increase, however, in the years 1962 and 1963. The rate of hospital separations, on the other hand, rose from 418 to 560 during the period till 1961, a percentage change of 34.0, to decline again somewhat in 1962 and 1963.

TABLE 28
MALIGNANT NEOPLASMS,
RATES OF MORTALITY AND HOSPITAL SEPARATIONS, AND INDICES,
CANADA, 1951 – 1963

| Year | Deaths | | Hospital Separations | |
|------------|--|-----------------------|--|-----------------------|
| | Rate per 100,000 Population ¹ | Per Cent of 1951 Rate | Rate per 100,000 Population ² | Per Cent of 1951 Rate |
| 1951 | 127.3 | 100.0 | 418 | 100.0 |
| 1952 | 128.7 | 101.1 | 418 | 100.0 |
| 1953 | 129.0 | 101.3 | 415 | 99.3 |
| 1954 | 128.9 | 101.3 | 434 | 103.8 |
| 1955 | 129.4 | 101.6 | 471 | 112.7 |
| 1956 | 129.8 | 102.0 | 497 | 118.9 |
| 1957 | 128.8 | 101.2 | 506 | 121.1 |
| 1958 | 127.6 | 100.2 | 512 | 122.5 |
| 1959 | 127.2 | 99.9 | 530 | 126.8 |
| 1960 | 129.7 | 101.9 | 560 | 134.0 |
| 1961 | 129.7 | 101.9 | 560 | 134.0 |
| 1962 | 132.0 | 103.7 | 550 | 131.6 |
| 1963 | 132.7 | 104.2 | 520 | 124.4 |

¹ Dominion Bureau of Statistics, annual reports of Vital Statistics, Ottawa: Queen's Printer, various years.

² Department of Public Health, annual reports of Saskatchewan Hospital Services Plan, Regina: Queen's Printer, various years.

A comparison with selected other countries shows the Canadian mortality to be lower than that of England and Wales, France, Sweden, and the United States, but very substantially higher than that of Mexico and Ceylon. These are crude rates, however, which have not been adjusted for the different age composition of the populations of these countries.

While the total mortality rate displays very little change over the years, the effects of the disease are becoming quite different between the two sexes. After adjustment for the age composition, we find that a significant increase has been taking place in male mortality and a significant decrease in female mortality.¹ The percentage distribution by site of cancer mortality in each sex will further illustrate the sex difference (data relate to 1961):

¹ Phillips, A.J., "Cancer Mortality Trends in Canada – 1941 to 1958", The British Journal of Cancer, 1961, Vol. XV, reprint, p. 8.

| Male | Per Cent | Female | Per Cent |
|---|----------|---|----------|
| All cancer | 100.0 | All cancer..... | 100.0 |
| Digestive organs and peritoneum | 40.2 | Breast and genito-urinary organs | 41.0 |
| Respiratory system..... | 19.7 | Digestive organs and peritoneum | 37.1 |
| Breast and genito-urinary organs | 18.2 | Miscellaneous and unspecified sites..... | 8.6 |
| Lymphatic and haematopoietic tissues..... | 14.5 | Lymphatic and haematopoietic tissues..... | 7.9 |
| Miscellaneous and unspecified sites..... | 8.7 | Respiratory system | 4.1 |
| Buccal cavity and pharynx | 3.1 | Buccal cavity and pharynx..... | 1.3 |

Source: Based on Dominion Bureau of Statistics, Vital Statistics, 1961, Ottawa: Queen's Printer, 1963.

Phillips studied the mortality trends for selected sites for the period between 1941 and 1958, based on age-adjusted rates, and found the following statistically significant changes:¹

Significant increases, 1941 -1957

| Male | Female |
|-----------------------------|------------------|
| Respiratory system (26.3%) | Leukaemia (4.7%) |
| Male genital organs (14.1%) | |
| Urinary organs (8.8%) | |
| Leukaemia (6.8%) | |

Significant decreases, 1941 -1957

| Male | Female |
|-----------------------------------|--------------------|
| Stomach (24.9%) | Intestines (17.0%) |
| Buccal cavity and pharynx (4.3%) | Uterus (13.2%) |
| | Stomach (11.4%) |

While both sexes have shown a decrease of cancer of the stomach, the increase of the over-all cancer death rate for males is influenced largely by the substantial increase in the rate for the respiratory system,² and the decrease for females

¹ Ibid., p. 3.

² The mortality rate from cancer of the lung (including bronchus and trachea) has risen as follows since 1951:

| | 1951 | 1961 |
|--------|------|------|
| Male | 15.5 | 26.2 |
| Female | 3.4 | 4.0 |

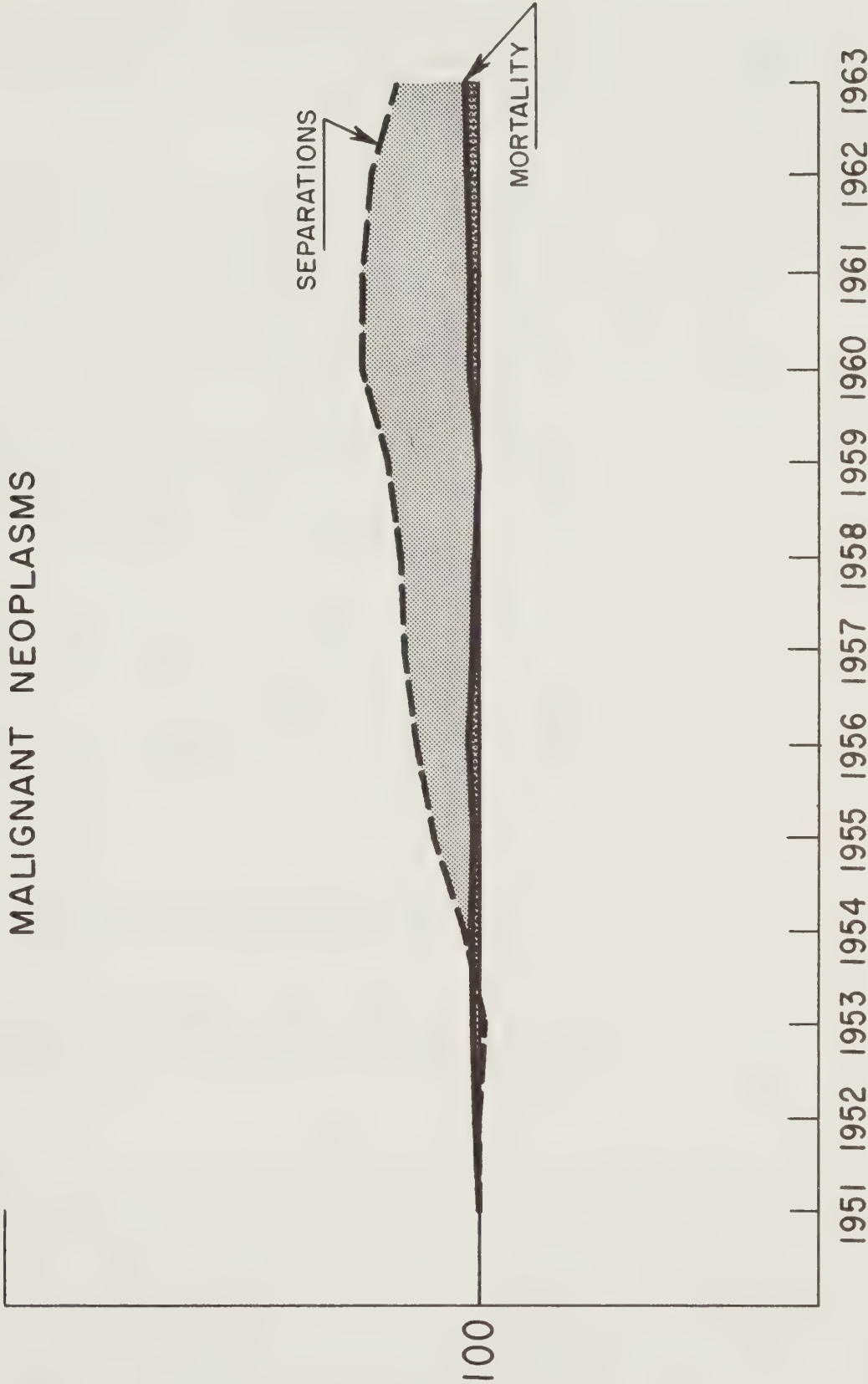
Source: Communication from Dominion Bureau of Statistics.

FIGURE — 15 A

PERCENTAGE CHANGE IN RATES OF MORTALITY AND HOSPITAL SEPARATIONS

1951-1963

MALIGNANT NEOPLASMS



Source: Table 28.

by the falling off in the mortality from cancer of the intestines and the uterus. The latter is ascribed to large-scale cytological screenings with the resulting early detection and diagnosis.

Health agencies as well as the public at large have been much concerned at the continuing rise in the frequency of lung cancer, especially among males. Incriminated as factors in this increase are cigarette smoking, air pollution and exposure to industrial carcinogenic substances.¹

All the statistics mentioned relate to the mortality, the only manifestation of the disease for which we have Canada-wide statistics over a considerable period of time. No comparable data exist on the actual occurrence, i.e., incidence and prevalence of the disease,² but data are available from some provincial programmes, such as an incidence study in Manitoba³ from which selected statistics as shown in Table 29 illustrate the relationship between incidence and mortality.

The table indicates that about twice as many new cases of cancer are found in a year than there are deaths from the disease. The ratio varies among the different sites but the discrepancy is greatest for cancer of the skin. Further studies will be required, and the necessity of undertaking such investigations should be stressed to determine to what extent the differences are due either to varying survival rates or to differences in diagnostic practices, time lag, or other factors. The cancer registries existing or being developed in the provinces should lend themselves to this kind of study recognizing the fact that both incidence (as well as prevalence) and mortality represent different stages or degrees of cancer morbidity. The registries and regular follow-up studies of the existing records should also yield more general and continuous data than now exist on the survival of cancer cases and the epidemiology of the disease.⁴

¹ Department of National Health and Welfare, *Smoking and Health*, prepared for the Canadian Conference on Smoking and Health, Ottawa: The Department, 1963, p. 9; see also: U.S. Department of Health, Education, and Welfare, *Public Health Service, Smoking and Health*, Washington, D.C.: U.S. Government Printing Office, 1964.

² Phillips reported recently the result of a study which found an estimated annual incidence of 6.3 cases of primary bone cancer per million population in Canada. The study was undertaken to obtain a basis for further observations of the effects of strontium 90 (Phillips, A.J., "A Mortality Study of Primary Tumours of Bone in Canada", *Canadian Medical Association Journal*, February 20, 1965, pp. 391-393).

³ The Manitoba Cancer Treatment and Research Foundation, Report April 1, 1961 to March 31, 1962.

⁴ Such studies would permit the evaluation of therapeutic procedures as well as changing patterns of the disease. A project of this kind was carried out by T.A. Watson in Saskatchewan in his report: "Results of Treatment of Cancer in Saskatchewan 1945-52 (inclusive)", published in 1958. The Annual Report of The Manitoba Cancer Treatment and Research Foundation April 1, 1961 to March 31, 1962, states on p. 25 in regard to survival studies that "over all five year results will now be required annually as part of the criteria for approval of a Cancer Registry, by the Committee on Cancer of the American College of Surgeons". The differences shown in the existing sources are difficult to assess because of the limited number of cases covered. Cancer is one of the diseases where the knowledge of differentials between various groups of the population and people in various parts of the world has been exploited considerably in efforts to detect leads regarding the causation of the disease. Such projects of international epidemiology require uniformity of methods if the results are to be comparable. Recognizing this fact, the Second World Health Assembly requested action resulting in the creation of a sub-committee (of the Expert Committee on Health Statistics) on the Registration of Cases of Cancer as well as their Statistical Presentation. The report on its first session is contained in World Health Organization "Technical Report", Series No. 5, Geneva: The Organization, March 1950.

TABLE 29
CANCER DEATHS AND NEW CASES, MANITOBA 1961-62,
BY SITE AND SEX
(Rates per 100,000 population)

| Site | Male | | Female | |
|---|--------|-----------|--------|-----------|
| | Deaths | New Cases | Deaths | New Cases |
| Buccal Cavity and Pharynx..... | 2.3 | 19.8 | 1.3 | 4.6 |
| Digestive Organs and Peritoneum | 63.2 | 83.6 | 43.7 | 65.1 |
| Oesophagus and Stomach | 26.9 | 31.6 | 12.8 | 15.0 |
| Intestines, Rectum, Peritoneum | 20.9 | 35.4 | 17.7 | 36.2 |
| Liver, Pancreas, Biliary Passages..... | 15.4 | 16.6 | 13.2 | 13.9 |
| Respiratory System | 38.6 | 41.8 | 5.1 | 7.7 |
| Breast and Genito-Urinary..... | 25.4 | 64.2 | 41.3 | 137.9 |
| Breast | 0.4 | 0.4 | 18.5 | 63.3 |
| Female Genital..... | — | — | 19.7 | 67.1 |
| Male Genital..... | 17.3 | 42.7 | — | — |
| Urinary Organs | 7.7 | 21.1 | 3.1 | 7.5 |
| Other and Unspecified Organs | 14.5 | 70.8 | 11.7 | 61.4 |
| Skin | 1.7 | 50.8 | 1.1 | 40.8 |
| Eye | 0.4 | 1.9 | 0.2 | 0.2 |
| Brain and Nervous System..... | 5.8 | 6.6 | 4.0 | 6.9 |
| Thyroid and Endocrine Glands .. | 0.6 | 1.7 | 1.3 | 2.6 |
| Bones and Connective Tissue .. | 1.9 | 2.6 | — | 1.6 |
| Other and Unspecified Sites | 4.1 | 7.2 | 5.1 | 9.3 |
| Lymphatic and Haematopoietic System | 18.8 | 23.3 | 9.9 | 13.9 |
| Hodgkin's Disease | 1.9 | 3.2 | 0.4 | 1.6 |
| Other Lymphomas | 5.3 | 4.7 | 2.4 | 2.4 |
| Multiple Myeloma | 4.1 | 4.3 | 2.7 | 2.6 |
| Leukaemia and Aleukaemia | 7.5 | 10.2 | 4.0 | 6.4 |
| Polycythaemia Vera | — | 0.9 | 0.4 | 0.9 |
| All Sites | 162.8 | 303.7 | 113.0 | 290.6 |

Source: Based on The Manitoba Cancer Treatment and Research Foundation, Report April 1, 1961 to March 31, 1962, pp. 66-67 and 99-100.

While cancer occurs at all ages, both incidence and mortality rise with increasing age as demonstrated in Table 30 and Figure 16, based on data from The Manitoba Cancer Treatment and Research Foundation. Hence, the changing age composition of the population accentuates the rise of cancer as a major health problem.

The geographic distribution of cancer mortality in the United States led the Health Information Foundation to conclude in 1959 that:

“Cancer mortality is highest in the urban and metropolitan areas of the United States and in the industrial Northeastern and North Central States. It is lowest in the South Central and Mountain States.”¹

This is similar to the distribution found by the President’s Commission on Heart Disease, Cancer and Stroke.² The latter report supports the view that the chances of survival are generally improving.³ Dr. Endicott, the Director of the United States National Cancer Institute, summed it up like this:

“At the turn of the century a cancer victim had little hope of getting well. Twenty years ago one out of four was being saved. At the present time one out of three is being saved and it has been said many times that we ought to be able to save half of all cases with what we know about cancer today.”⁴

TABLE 30
CANCER INCIDENCE AND MORTALITY, BY AGE,
RATES PER 100,000 POPULATION, MANITOBA, 1960

| Age | Rate of New Cases | Death Rate |
|------------------|-------------------|------------|
| Under 25 | 18.4 | 8.4 |
| 25 – 29 | 54.6 | 10.6 |
| 30 – 34 | 69.0 | 32.0 |
| 35 – 39 | 164.2 | 45.2 |
| 40 – 44 | 238.2 | 57.8 |
| 45 – 49 | 354.3 | 114.3 |
| 50 – 54 | 464.0 | 146.4 |
| 55 – 59 | 584.0 | 293.3 |
| 60 – 64 | 839.1 | 369.1 |
| 65 – 69 | 1,164.3 | 607.1 |
| 70 – 74 | 1,535.3 | 829.9 |
| 75 – 79 | 1,879.5 | 1,036.1 |
| 80 – 84 | 2,304.9 | 1,365.9 |
| 85 – 89 | 2,903.2 | 1,419.4 |
| 90 and over..... | 3,900.0 | 2,000.0 |

Source: Manitoba Cancer Treatment and Research Foundation, Report April 1, 1960 to March 31, 1961, pp. 42 and 68.

¹ Health Information Foundation, “Trends in Cancer Control”, Progress in Health Services, February 1959, p. 4.
² The President’s Commission on Heart Disease, Cancer and Stroke, A National Program to Conquer Heart Disease, Cancer, and Stroke, Volume I, Washington: U.S. Government Printing Office, 1964, p. 8.
³ Ibid., p. 10.
⁴ Endicott, K.M., “The Total Effort against Cancer”, American Journal of Public Health, Part II, August 1961, p. 1.

FIGURE — 16

CANCER
BOTH INCIDENCE AND MORTALITY RISE SHARPLY WITH AGE
(AGE-SPECIFIC INCIDENCE AND MORTALITY RATES, MANITOBA 1960)



Source: The Manitoba Cancer Treatment and Research Foundation, Report April 1, 1960 to March 31, 1961.

See also Table 30.

Though cancer remains one of the largely unsolved health problems, the picture is not completely without encouraging signs even pending a major breakthrough in the research into the nature and causes of cancer.

Between 1941 and 1961 the cancer death rate (age adjusted) has increased in Canada for males (from 123 per 100,000 population to 149) but it declined for females (from 125 to 114). The death rate from cancer of the stomach has decreased for both sexes.¹ If the smoking habit can be curtailed, reductions of cancer in certain sites may be expected. This applies mostly to lung cancer where the excess of observed death of smokers over expected deaths of non-smokers was 454 per cent.² The United States Report on Smoking and Health mentions also other sites as associated with or related to smoking to a lesser degree: i.e., cancer of the lip, larynx, esophagus, and urinary bladder.³ Survival rates for the various forms of cancer are being studied increasingly in connection with the cancer treatment programmes in various provinces, as they are in the United States and elsewhere. Although the sciences are still searching for the means of preventing and reliably curing cancer, encouraging results have been obtained with presently known methods. In summarizing its experience, the California Tumor Registry⁴ emphasizes the effect of early diagnosis. Five-year survival rates were much higher for patients with cancer localized at the time of diagnosis. Breast and uterine cancer patients with localized disease had rates as high as 72-75 per cent. Patients with stomach and lung cancer had rates of 28 and 16 per cent respectively. High survival rates at 15 years were observed for patients with cancer of the cervix, corpus uteri, breast, melanoma, and other skin cancers, with lower rates for cancer of the stomach and lung, and leukaemia. It is interesting to note the similarity in the experience between California and Connecticut, both with extensive records over a long period of time.⁵ Among projects promising success in the reduction of cancer is the cervical cytology screening programme in British Columbia which has been implemented under the assumption that "detection and removal of preclinical carcinoma is a worthwhile and effective means of virtually eliminating carcinoma of the cervix from our population".⁶ The programme has been compared to tuberculosis and syphilis case finding programmes, the cost being 99¢ per specimen; over a 14-year period it has cost the programme about \$360 to detect a case of cancer. Some 1,600 cases showed cellular changes of preclinical cancer of whom some 800 would probably have developed symptomatic cancer.⁷

¹ Phillips, A.J., "Mortality from Cancer in Canada", *Canadian Public Health Journal*, January 1965, pp. 21-23.

² Best, E.W.R., Walker, C.B., "A Canadian Study of Smoking and Health" *Smoking and Health — Reference Book*, Ottawa: Queen's Printer 1964, p. 114.

³ U.S. Public Health Service, *Smoking and Health*, Public Health Service Publication No. 1103; Washington: U. S. Government Printing Office 1964, p. 32.

⁴ California Tumor Registry, *Cancer Registration and Survival in California*, Berkeley, State of California Department of Public Health, 1963, p. 80.

⁵ Axtell, L.M., et al., "Trends in Survival Rates of Cancer Patients: Connecticut and California", *End Results and Mortality Trends in Cancer*, National Cancer Institute Monograph No. 6, Washington: U.S. Government Printing Office, 1961, pp. 49-68.

⁶ Taylor, J.A., *Cervical Cytology Screening Programme*, paper presented at Annual Meeting of the Canadian Public Health Association, Edmonton, 1965.

⁷ *Ibid.*

Statistical Summary

Mean Age at Death from Neoplasms:

During the period from 1951 to 1961, when the mean age at death from all causes had risen from 57.3 to 61.0 (a rise of 6.5 per cent), the corresponding figures for deaths from neoplasms were:

| | <u>1951</u> | <u>1961</u> | <u>Per Cent Increase</u> |
|------------|-------------|-------------|--------------------------|
| Both sexes | 63.6 | 64.9 | 2.0 |
| Male | 64.8 | 65.9 | 1.7 |
| Female | 62.3 | 63.6 | 2.1 |

For all malignant neoplasms only, the corresponding figures differ only slightly from those for the entire group of neoplasms, with the mean age at death being somewhat higher and the percentage increase somewhat lower for the malignant neoplasms alone.

Incidence and Prevalence of Neoplasms according to the Canadian Sickness Survey 1950-51:

Sickness Survey figures are available only for the total of all neoplasms and as such are not very meaningful. They are as follows:

| | <u>Persons Developing New Illness During Year, per 100,000 Population</u> | <u>Persons Sick Any Day, per 100,000 Population</u> |
|---------------|---|---|
| All neoplasms | 520 | 270 |

Neoplasms in Canada and Selected Other Countries:

The mortality rate from all neoplasms, which differs only slightly from that for malignant neoplasms, was lower in Canada in 1959 than in the United States, England and Wales, France, and Sweden, but substantially higher than in Mexico and Ceylon. These rates, it must be remembered, are not age-adjusted so that higher rates must be expected where there is a greater proportion of older people.

| | <u>Mortality Rate per 100,000 Population</u> |
|-------------------|--|
| Canada | 129.1 |
| United States | 150.2 |
| England and Wales | 216.8 |
| France | 202.1 |
| Sweden | 184.9 |
| Mexico | 38.7 |
| Ceylon | 21.2 |

Neoplasms and Their Share of Total Illness and Health Care:

All cancer accounts for 16.8 per cent of all deaths, slightly less (13.7 per cent) of the life years lost due to premature mortality, only 0.9 per cent of all disability days, 3.6 per cent of hospital days, 5.1 per cent of physicians' services, 0.3 per cent of all prescriptions, but 7.0 per cent of home nursing services.

Following are the percentages of total illness and the demand for selected health services accounted for by all forms of cancer and the benign neoplasms together:

| | All Cancer Per Cent | All Neoplasms Per Cent |
|-----------------------------|------------------------|---------------------------|
| All deaths..... | 16.8 | 17.0 |
| Premature mortality..... | 13.7 | 13.7 |
| Disabling illness..... | 0.9 | 2.0 |
| Non-disabling illness | n.a. | 1.4 |
| Hospital separations..... | 2.5 | 4.6 |
| Hospital days..... | 3.6 | 4.6 |
| Physicians' services..... | 5.1 | 5.8 |
| Prescriptions | 0.3 | 0.3 |
| Home nursing | 7.0 | 7.3 |

ALLERGIC, ENDOCRINE SYSTEM, METABOLIC AND NUTRITIONAL DISEASES

This group of diseases includes the allergic disorders (such as hay fever, asthma), diabetes, as well as various glandular disorders and nutritional deficiency diseases. It is a heterogeneous group which, as a whole, is characterized by the fairly even trend of mortality and hospitalization over the last decade as indicated in Table 31 and Figure 17.

The trend reflects the lack of substantial progress in dealing with the major diseases included here, although the first half of the period saw a decline in mortality of about 16 per cent (from a rate of 20.5 per 100,000 population in 1951 to 17.2 in 1957, the rate rose to 17.4 again in 1963). The rate of hospitalization remained at close to 600 separations per 100,000 population, until a rise has been observed from 1961 on.

Diabetes

Diabetes is the disease which accounts for most of the mortality in this group. While the death rate for the whole group has generally declined, mainly due to a considerable reduction in the deaths from asthma, the diabetes rate has changed very little during the period under observation but showed an increase in 1963 and the absolute number of deaths has been increasing throughout the period.

TABLE 31

ALLERGIC, ENDOCRINE SYSTEM, METABOLIC AND NUTRITIONAL DISEASES,
RATES OF MORTALITY AND HOSPITAL SEPARATIONS, AND INCIDENCES,
CANADA, 1951-1963

| Year | Deaths | | Hospital Separations | |
|------------|--|-----------------------------|--|-----------------------------|
| | Rate per 100,000 Population ¹ | Per Cent of 1951 Rate | Rate per 100,000 Population ² | Per Cent of 1951 Rate |
| 1951 | 20.5 | 100.0 | 593 | 100.0 |
| 1952 | 19.1 | 93.2 | 642 | 108.3 |
| 1953 | 18.3 | 89.3 | 618 | 104.2 |
| 1954 | 17.7 | 86.3 | 614 | 103.5 |
| 1955 | 17.6 | 85.9 | 627 | 105.7 |
| 1956 | 17.6 | 85.9 | 641 | 108.1 |
| 1957 | 17.2 | 83.9 | 663 | 111.8 |
| 1958 | 16.4 | 80.0 | 595 | 100.3 |
| 1959 | 16.8 | 82.0 | 630 ³ | 106.2 |
| 1960 | 16.4 | 80.0 | 600 | 101.2 |
| 1961 | 17.0 | 82.9 | 600 | 101.2 |
| 1962 | 16.6 | 81.0 | 630 | 106.2 |
| 1963 | 17.4 | 84.9 | 660 | 111.3 |

¹ Dominion Bureau of Statistics, annual reports of Vital Statistics, Ottawa: Queen's Printer, various years.

² Department of Public Health, annual reports of Saskatchewan Hospital-Services Plan, Regina: Queen's Printer, various years.

³ From 1951 to 1958 the rate covered only categories C 14 to C 17 of the International Classification of Diseases.

No reliable data are available on the incidence or prevalence of diabetes in Canada but the results of several surveys agree as to the general order of size of the problem. Observations based on the Canadian Sickness Survey 1950-1951¹ indicate about 770 cases per 100,000 population, or a total of about 150,000 known cases now existing in Canada.² This is a little higher than the 750 per 100,000 population over 6 years of age found in Newmarket³ and similar proportions in

¹ These data were not published because the survey sample did not yield a sufficient number of cases for a reliable estimate.

² This very rough estimate compares with the somewhat higher prevalence rate of 900 per 100,000 population in the U.S. (Health Statistics from the United States National Health Survey: Diabetes reported in interviews, United States, July 1957-June 1959, United States Department of Health, Education, and Welfare, Washington D.C., United States Government Printing Office, 1960, p. 7). But then the U.S. mortality rate (15.9 in 1959) is also higher than the Canadian (11.4 in 1959) indicating that a real difference exists in the frequency of the disease in the two countries.

³ Kenny, A.J., et al., "A Study of the Prevalence of Diabetes in an Ontario Community", Canadian Medical Association Journal, 1951, pp. 233-241.

Porcupine and Hawkesbury¹. Rates found in European countries are of similar magnitude.²

Diabetes, Deaths, Canada, 1951–1963

| Year | Number of Deaths | Rate per 100,000 Population |
|-----------|------------------|-----------------------------|
| 1951..... | 1,584 | 11.3 |
| 1952..... | 1,577 | 10.9 |
| 1953..... | 1,621 | 10.9 |
| 1954..... | 1,607 | 10.5 |
| 1955..... | 1,716 | 10.9 |
| 1956..... | 1,820 | 11.3 |
| 1957..... | 1,866 | 11.2 |
| 1958..... | 1,869 | 10.9 |
| 1959..... | 1,988 | 11.4 |
| 1960..... | 2,081 | 11.6 |
| 1961..... | 2,164 | 11.9 |
| 1962..... | 2,169 | 11.7 |
| 1963..... | 2,302 | 12.2 |

Source: Based on Dominion Bureau of Statistics Causes of Death, Canada 1950–1960, Ottawa: Queen’s Printer, 1962, p. 11, and annual reports of Vital Statistics, Ottawa: Queen’s Printer, various years.

While there is yet no cure for diabetes, the life expectancy of diabetics has risen sharply, especially since the introduction of insulin in the 1920’s. In the period 1897-1913 the life expectancy of a 10-year old diabetic was 1.3 years; by 1947-51 it was 44.3 years,³ and is probably still higher today. Among causative factors of the disease are heredity (the longer life expectancy of diabetics increases the probability of diabetic children being born), food consumption and energy expenditure, so that overweight also will be a factor.⁴ This relates the disease to the way of life in a highly industrialized and affluent society.

The death rate in 1960 was higher for females (13.4) than for males (10.0) which corresponds to a similar difference in the prevalence rate found in the United States National Health Survey (1,000 and 800 respectively per 100,000 population). The same Survey in the United States reported two-thirds of all diabetics to be 55 years of age or older.

¹ Kenny, A.J., Chute, A.L., “Diabetes in Two Ontario Communities: Studies in Case Finding”, Diabetes, 1953, pp. 187-193.

² Entmacher, P.S., Marks, H.H., “Diabetes in 1964 – A World Survey”, Diabetes, April 1965, pp. 212–223.

³ Health Information Foundation, “Trends in Diabetes Control”, Progress in Health Services, February 1958, pp. 4 – 5.

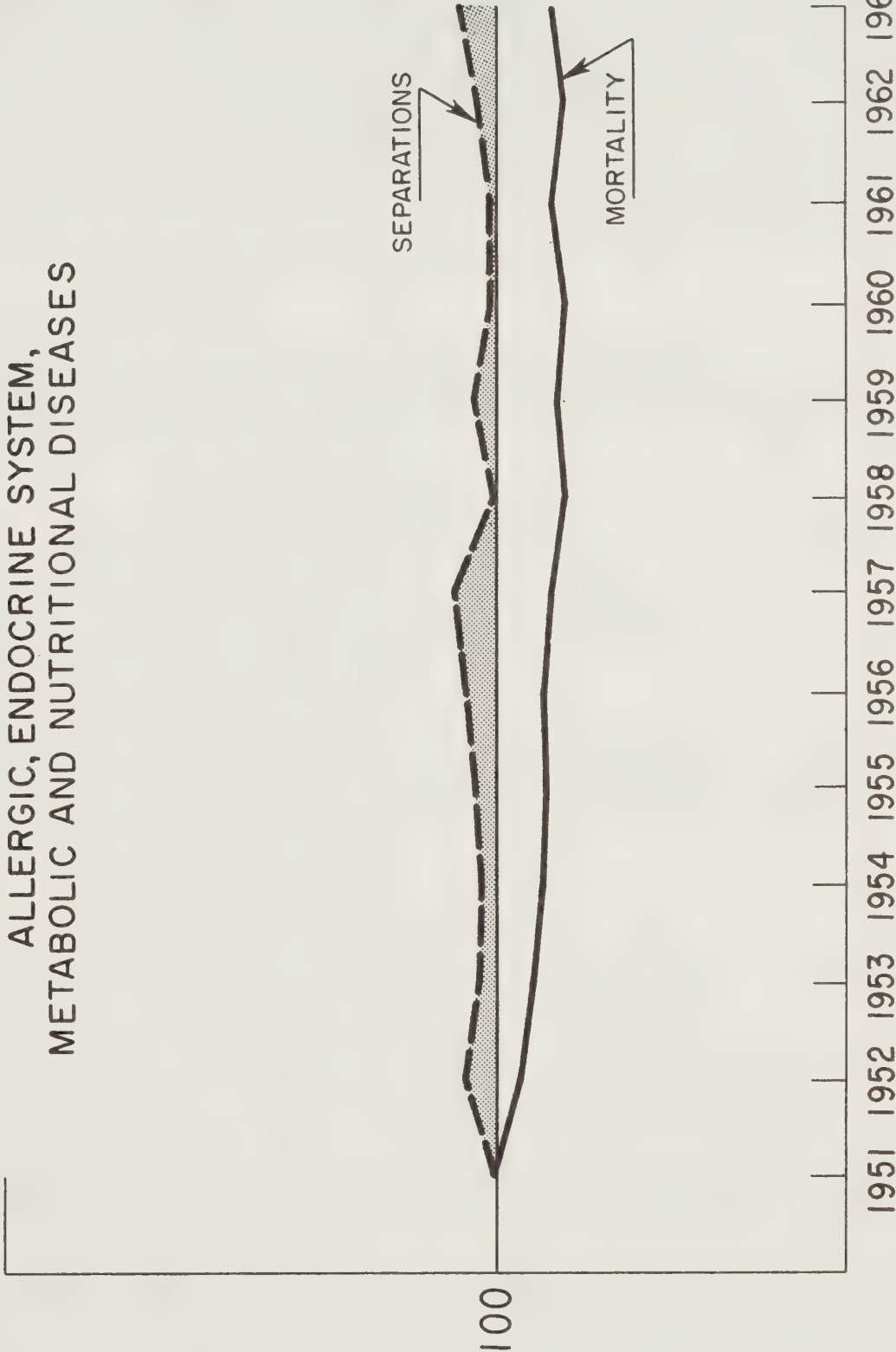
⁴ Entmacher, P.S., op. cit., pp. 221–222.

FIGURE — 17

PERCENTAGE CHANGE IN RATES OF MORTALITY AND HOSPITAL SEPARATIONS

1951 — 1963

ALLERGIC, ENDOCRINE SYSTEM,
METABOLIC AND NUTRITIONAL DISEASES



Source: Table 31.

It has been said that the known cases of diabetes may be matched by an equal number of undetected cases.¹ This contention is supported by results of case-finding programmes here as well as in other countries.²

Diabetics account for a large proportion of home nursing services. They are not numerous (about 5 per cent of all medical and surgical cases attended by the Victorian Order of Nurses) but require intensive care. They obtain 14 per cent of all nursing visits made to medical and surgical cases, ranking highest among all disease groups in the average number of visits per case (54 as compared with an average of 19 for all causes). Female cases outnumber male by a ratio of over 2:1, with 90 per cent of all cases being in the age group 45 years and over.³

Cases of diabetes, many requiring continuous medication, account for about two per cent of all prescriptions.⁴

Asthma

Asthma has been the second largest cause of death in this group but one which contributed to the general decline in the mortality, except for the small upswing apparent in 1961:

Asthma, Deaths, 1951-1961

| Year | Number of Deaths | Rate per 100,000 Population |
|------------|------------------|-----------------------------|
| 1951 | 741 | 5.3 |
| 1952 | 662 | 4.6 |
| 1953 | 644 | 4.3 |
| 1954 | 629 | 4.1 |
| 1955 | 639 | 4.1 |
| 1956 | 598 | 3.7 |
| 1957 | 599 | 3.6 |
| 1958 | 502 | 2.9 |
| 1959 | 494 | 2.8 |
| 1960 | 402 | 2.2 |
| 1961 | 468 | 2.6 |

Source: Based on Dominion Bureau of Statistics Causes of Death, Canada 1950-1960, Ottawa: Queen's Printer, 1962, p. 11, and communication from the Dominion Bureau of Statistics.

¹ Department of National Health and Welfare, Epidemiological Data on Chronic Illness in Canada, Ottawa, 1951, mimeographed.

² Entmacher, P.S., op. cit., pp. 214-215.

³ Dominion Bureau of Statistics, Home Nursing Services (Victorian Order of Nurses for Canada), 1960, Ottawa: Queen's Printer, 1962.

⁴ Canadian Disease and Therapeutic Index, A Study of Physician Practice, February-May 1960, Lea Associates, Inc., Flourtown, Pa.

Here again the lack of data on the incidence and prevalence of the disease precludes the full evaluation of the mortality figures and we have no evidence to tell us whether the decline in mortality until 1960 was due to a reduction in the frequency of the disease or, which is more likely, to a reduction of its fatal aspects.

Estimates of the frequency of asthma and hay fever in the United States range all the way from about 1,000 to 6,900¹ per 100,000 population. This may reflect regional differences in the occurrence of the disease, making it doubtful whether the United States National Health Survey prevalence figure (2,340 per 100,000 population) is applicable to Canada. This Survey points out the preponderance of asthma and hay fever among young males (under 15 years) as compared with females in the same age group.²

Statistical Summary

Mean Age at Death from Allergic Disorder, and Endocrine, Metabolic, and Blood Diseases:

For the computation of the mean age at death, two of the main groups of the International Classification of Diseases were combined, namely the allergic and other disorders discussed under this group and the following group of the Diseases of the Blood and Blood -Forming Organs.

During the period from 1951 to 1961, when the mean age at death from all causes had risen from 57.3 to 61.0 (a rise of 6.5 per cent), the corresponding figures for the combined groupes were:

| | 1951 | 1961 | Per Cent Increase |
|------------|------|------|----------------------|
| Both sexes | 60.0 | 64.9 | 8.2 |
| Male | 58.6 | 63.5 | 8.4 |
| Female | 61.4 | 66.1 | 7.7 |

¹ Cf. The Committee for the Special Research Project in the Health Insurance Plan of Greater New York: Health and Medical Care in New York City, Commonwealth Fund, Cambridge, Mass.: Harvard University Press, 1957; and State of California, Department of Public Health, Health in California, California Health Survey, California State Printing Office (no date).

² United States Public Health Service, Health Statistics from the United States National Health Survey — Chronic Respiratory Conditions reported in Interviews, United States July 1957 — June 1958, Washington: United States Government Printing Office, 1961.

Incidence and Prevalence of Allergic, Endocrine System, Metabolic and
Nutritional Diseases, According to the Canadian Sickness Survey 1950 – 1951

| | Persons Developing New Illness during Year, per 100,000 Population | Persons Sick Any Day, per 100,000 Population |
|---|---|--|
| <u>All Diseases in Group</u> | 1,030 | 680 |
| Hay Fever | — | 80 |
| Asthma | — | 150 |
| Urticaria and other allergic disorders | 520 | 40 |
| Diabetes, thyroid, and other endocrine, metabolic and nutritional diseases | — | 410 |

Diabetes in Canada and Selected Other Countries:

A comparison with selected other countries shows mortality in Canada at about the same level as that in France and Sweden, lower than that in the United States and higher than that in England and Wales, and substantially higher than that of Mexico and Ceylon:

| | Death Rate per 100,000 Population (1959) |
|-------------------|---|
| Canada | 11.4 |
| United States | 15.9 |
| England and Wales | 7.0 |
| France | 11.5 |
| Sweden | 12.6 |
| Mexico | 6.7 |
| Ceylon | 7.2 |

Allergic, Endocrine System, Metabolic and Nutritional Diseases and Their Share of Total Illness and Health Care:

The share of these diseases in mortality and disabling illness is inconspicuous: they account for 2.2 per cent of all deaths, somewhat less (1.8 per cent) of the life years lost due to premature mortality because of deaths occurring generally at advanced ages; 1.3 per cent of all disability days; but 5 per cent of non-disabling illness.

Of similar proportions is their share of hospitalization and of physicians' services. But this group accounts for 7.0 per cent of all prescriptions and 11.1 per cent of home nursing services.

The demand for home nursing and prescriptions, as well as the share of non-disabling illness days is out of proportion to the frequency of these diseases, a fact which is explained by their nature. The allergies, such as hay fever or asthma, are characterized in common with diabetes, by their chronicity usually without being fatal, and they also share to a varying extent the need for medication, occasional in some cases, regular in others. Hay fever and asthma account for about one-third of the illness days ascribed to this class in the Canadian Sickness Survey.¹

Diabetes, asthma, hay fever and other diseases in this group are chronic but not necessarily disabling except during acute attacks. Hence, they account for a relatively high proportion of all non-disabling illness.

Following are the percentages accounted for by this entire group of diseases out of total illness and the demand for selected health services:

| | Per Cent |
|------------------------|----------|
| All deaths | 2.2 |
| Premature mortality | 1.8 |
| Disabling illness | 1.3 |
| Non -disabling illness | 5.0 |
| Hospital separations | 2.2 |
| Hospital days | 1.8 |
| Physicians' services | 2.0 |
| Prescriptions | 7.0 |
| Home nursing | 11.1 |

DISEASES OF THE BLOOD AND BLOOD-FORMING ORGANS

This group of diseases, comprised largely of the various types of anaemia, ranks low in its contribution to mortality and non-fatal illness and in its use of health services. Because of the low frequencies it is difficult to establish what the trend has been but Table 32 and Figure 18 indicate a general decline in the death rate which is not matched by what we know of hospital separations. The anaemias thus appear as another group of diseases where modern treatment has succeeded in curbing the mortality if not the frequency of the disease.

Little is known about the prevalence of anaemia in the general population -- a screening test in Baltimore yielded a count of 16 cases per 1,000 persons screened,² but it would be difficult to say how indicative this figure may be of the situation in Canada.

¹ Department of National Health and Welfare, and Dominion Bureau of Statistics, *Illness and Health Care in Canada, Canadian Sickness Survey, 1950-1951*, Ottawa: Queen's Printer, 1960, p. 140.

² Commission on Chronic Illness, *Chronic Illness in a Large City - The Baltimore Study*, Cambridge, Mass.: Harvard University Press, 1957, p. 485.

The death rate has declined from 4.3 per 100,000 population in 1951 to 2.8 in 1963. The rate of hospital separations varied during the same period upward and downward, starting from a rate of 77 per 100,000 population, and during the most recent three years hovering around the 100 mark. Table 32 and Figure 18 show the respective trends:

TABLE 32
DISEASES OF THE BLOOD AND BLOOD-FORMING ORGANS,
RATES OF MORTALITY AND HOSPITAL SEPARATIONS, AND INDICES,
CANADA, 1951-1963

| Year | Deaths | | Hospital Separations | |
|------------|--|-----------------------|--|-----------------------|
| | Rate per 100,000 Population ¹ | Per Cent of 1951 Rate | Rate per 100,000 Population ² | Per Cent of 1951 Rate |
| 1951 | 4.3 | 100.0 | 77 | 100.0 |
| 1952 | 4.0 | 93.0 | 87 | 113.0 |
| 1953 | 3.6 | 83.7 | 87 | 113.0 |
| 1954 | 3.2 | 74.4 | 76 | 98.7 |
| 1955 | 3.2 | 74.4 | 74 | 96.1 |
| 1956 | 3.1 | 72.1 | 76 | 98.7 |
| 1957 | 2.9 | 67.4 | 75 | 97.4 |
| 1958 | 3.3 | 76.7 | 79 | 102.6 |
| 1959 | 2.8 | 65.1 | 100 ³ | 129.9 |
| 1960 | 2.6 | 60.5 | 110 | 142.9 |
| 1961 | 2.8 | 65.1 | 100 | 129.9 |
| 1962 | 2.7 | 62.8 | 100 | 129.9 |
| 1963 | 2.8 | 65.1 | 110 | 142.9 |

¹ Dominion Bureau of Statistics, annual reports of Vital Statistics, Ottawa: Queen's Printer, various years.

² Department of Public Health, Annual Reports of Saskatchewan Hospital Services Plan, Regina: Queen's Printer, various years.

³ The sudden rise is due to a change in classification. From 1951 to 1958 the rate covers only category C18 of the International Classification of Diseases.

Statistical Summary

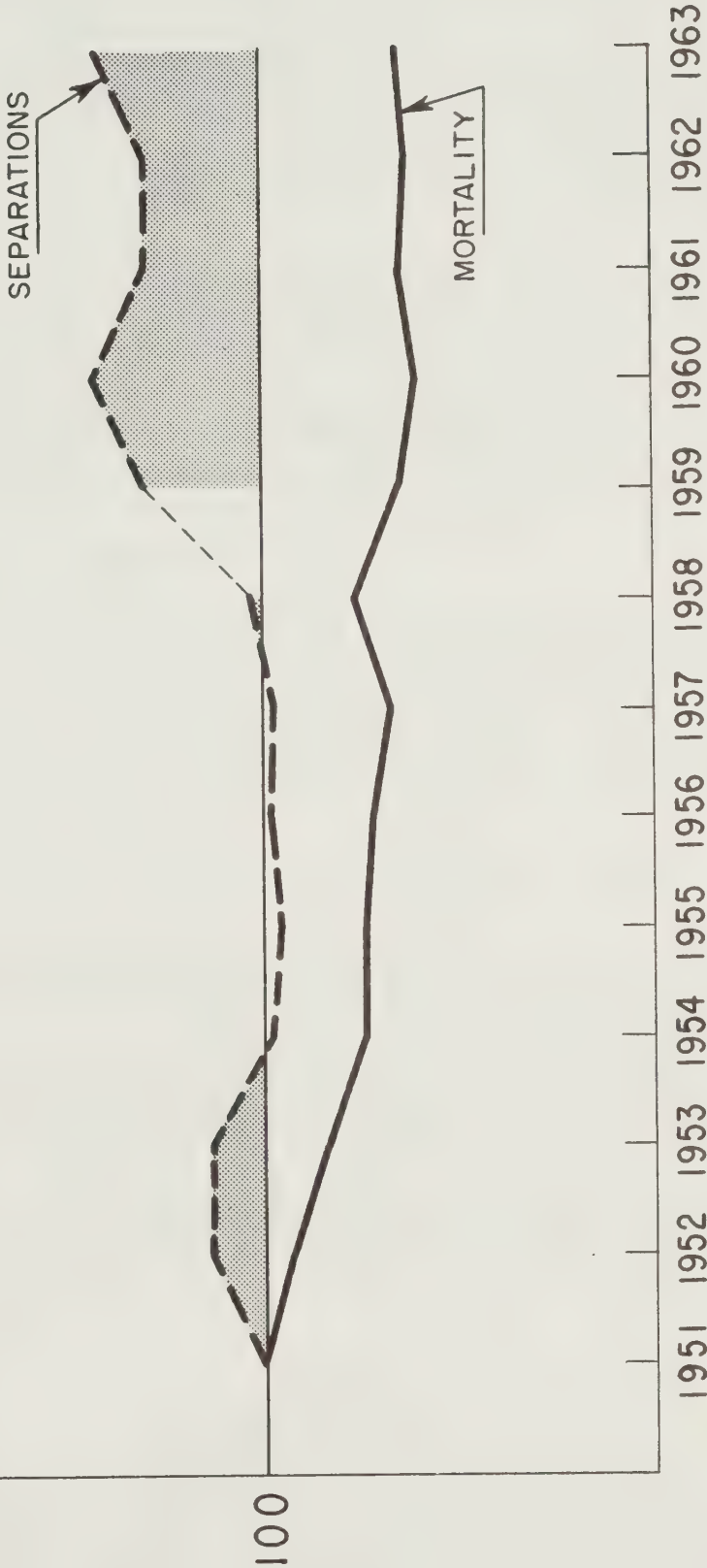
Mean Age at Death from Diseases of the Blood and Blood-forming Organs:

This has been shown combined with the data for the foregoing group to which reference is made.

FIGURE — 18

PERCENTAGE CHANGE IN RATES OF MORTALITY AND HOSPITAL SEPARATIONS
1951—1963

DISEASES OF THE BLOOD AND BLOOD-FORMING ORGANS



BREAK DUE TO CHANGES IN CLASSIFICATION

Source: Table 32.

Incidence and Prevalence of Diseases of the Blood and Blood-forming Organs
according to the Canadian Sickness Survey 1950-51:

| | Persons Developing New Illness during Year, per 100,000 Population | Persons Sick Any Day, per 100,000 Population |
|--|---|--|
| Diseases of the blood and blood-forming organs | 510 | 390 |

Anaemia in Canada and Selected Other Countries:

Because of the limitations of available data, this comparison is restricted to anaemia, the leading cause in this whole group of diseases. The Canadian rate is roughly in line with the United States, France, and Sweden; lower than England and Wales; and substantially lower than Mexico and Ceylon.

| | Death Rate per 100,000 Population (1959) |
|-------------------|---|
| Canada | 1.9 |
| United States | 1.8 |
| England and Wales | 3.7 |
| France | 1.4 |
| Sweden | 2.4 |
| Mexico | 9.3 |
| Ceylon | 28.3 |

Diseases of the Blood and Blood-forming Organs and Their Share of Total Illness
and Health Care:

The group accounts for less than one per cent of all deaths and life years lost due to premature mortality, less than one per cent of hospital and physicians' services, but a relatively higher share of all prescriptions and of home nursing, the latter being due largely to the application of the required injections. The percentages this group accounts for out of the total are as follows:

| | Per Cent |
|-----------------------|----------|
| All deaths | 0.4 |
| Premature mortality | 0.3 |
| Disabling illness | n.a. |
| Non-disabling illness | n.a. |
| Hospital separations | 0.4 |
| Hospital days | 0.3 |
| Physicians' services | 0.9 |
| Prescriptions | 2.8 |
| Home nursing | 6.8 |

MENTAL, PSYCHONEUROTIC AND PERSONALITY DISORDERS

Time and again the evidence presented to the Royal Commission on Health Services stresses the importance of mental disorder as one of Canada's most urgent and most extensive health problems. The Commission's Report reflects this view: "Of all the problems presented before the Commission, that which reflects the greatest public concern, apart from the financing of health services generally, is mental illness—case finding, diagnosis, treatment and rehabilitation".¹ Two studies were undertaken on behalf of the Commission, by Dr. D.G. McKerracher, and Dr. A. Richman,² which deal extensively with psychiatric disorder and psychiatric services in Canada and elsewhere. Those with special interest in this field are referred to these studies. In the context of the present presentation, only enough will be said to show how this group of diseases fits into the total picture of illness and health services in Canada.

Most health problems have attracted our attention because of their fatal aspects. Mental disease has never been prominent in this respect accounting, as it does, for only a very small proportion of all deaths: in all, 0.3 per cent of all deaths occurring in Canada are ascribed to disorders in this group.

The impact of mental disease lies not in the mortality but in its staggering effect of disability as well as the demand for health services, particularly hospital services. The diseases in this group account for 38.9 per cent of all hospital days. The 3.7 per cent of all prescriptions obtained outside the hospital,³ being ascribed to this group of diseases, may be an understatement to the extent that psychiatric disorders are reported under other diagnoses.

The trend of mortality and of first admissions to institutions is shown in Table 33 and Figure 19.

With changing patterns of care for the psychiatric patient, both within the institution and in the community, it is becoming more and more difficult to draw conclusions concerning the actual frequency of these diseases from institutional statistics. These data, nevertheless, give some indication of the magnitude of the problem.

Of all hospital beds (192,162) about one-third (67,895) were in mental hospitals in 1960.⁴ In addition, there were about 1,500 beds in psychiatric units in general hospitals.

¹Report of the Royal Commission on Health Services, Volume I, Ottawa: Queen's Printer, 1964, p. 21.

²McKerracher, D.G., Trends in Psychiatric Care, study prepared for the Royal Commission on Health Services, Ottawa: Queen's Printer, 1966; and Richman, A., Psychiatric Care: Extent and Results, study prepared for the Royal Commission on Health Services, Ottawa: Queen's Printer, 1966.

³In 1961, \$4,428,000 were spent on "medical, surgical supplies and drugs" in mental institutions, amounting to 3.4 per cent of their total operating expenditure; Dominion Bureau of Statistics, Mental Health Statistics, Financial Supplement, 1961, Ottawa: Queen's Printer, 1963, p. 10.

⁴Department of National Health and Welfare, Hospital Care in Canada, (unpublished report).

TABLE 33
MENTAL, PSYCHONEUROTIC, AND PERSONALITY DISORDERS,
RATES OF MORTALITY AND FIRST ADMISSIONS, AND INDICES, CANADA,
1951-1963

| Year | Deaths | | First Admissions | |
|-----------|--|-----------------------------|--|-----------------------------|
| | Rate per 100,000 Population ¹ | Per Cent of 1951 Rate | Rate per 100,000 Population ² | Per Cent of 1951 Rate |
| 1951..... | 3.1 | 100.0 | 78 | 100.0 |
| 1952..... | 2.8 | 90.3 | 81 | 103.8 |
| 1953..... | 3.3 | 106.5 | 86 | 110.3 |
| 1954..... | 2.3 | 74.2 | 103 | 132.1 |
| 1955..... | 2.2 | 71.0 | 123 | 157.7 |
| 1956..... | 2.5 | 80.6 | 123 | 157.7 |
| 1957..... | 2.2 | 71.0 | 125 | 160.3 |
| 1958..... | 2.8 | 90.3 | 130 | 166.7 |
| 1959..... | 2.7 | 87.1 | 141 | 180.8 |
| 1960..... | 2.6 | 83.9 | 143 | 183.3 |
| 1961..... | 2.6 | 83.9 | 153 | 196.2 |
| 1962..... | 2.3 | 74.2 | 161 | 206.4 |
| 1963..... | 2.5 | 80.6 | 180 | 230.8 |

¹ Dominion Bureau of Statistics, annual reports of Vital Statistics, Ottawa: Queen's Printer, various years.

² Dominion Bureau of Statistics, Mental Health Statistics, 1963, Ottawa: Queen's Printer, 1965.

In 1960 over 25 million days were spent in mental hospitals and psychiatric units, with an average daily number of patients of 69,000.¹ In other words, one in every 260 people is a patient in a psychiatric hospital or unit. It is estimated that, if present admission rates continue, more than one out of every ten infants will spend some part of his life in a psychiatric institution.² In addition, there are those suffering from psychiatric or emotional disorders but not necessarily confined to hospital whose number is unknown but estimated to be possibly in the neighbourhood of one in ten of the population.³

Based on studies in Britain and the United States it has been estimated that the prevalence of emotional and mental disorders among school children is of the order of 5 to 10 per cent,⁴ and mental retardation may affect at least 3 per cent of the population, one-fifth of this number under the age of 20.⁵ Among a large group

¹ Ibid.

² The Canadian Mental Health Association, brief submitted to the Royal Commission on Health Services, Toronto 1962, Appendix 3.

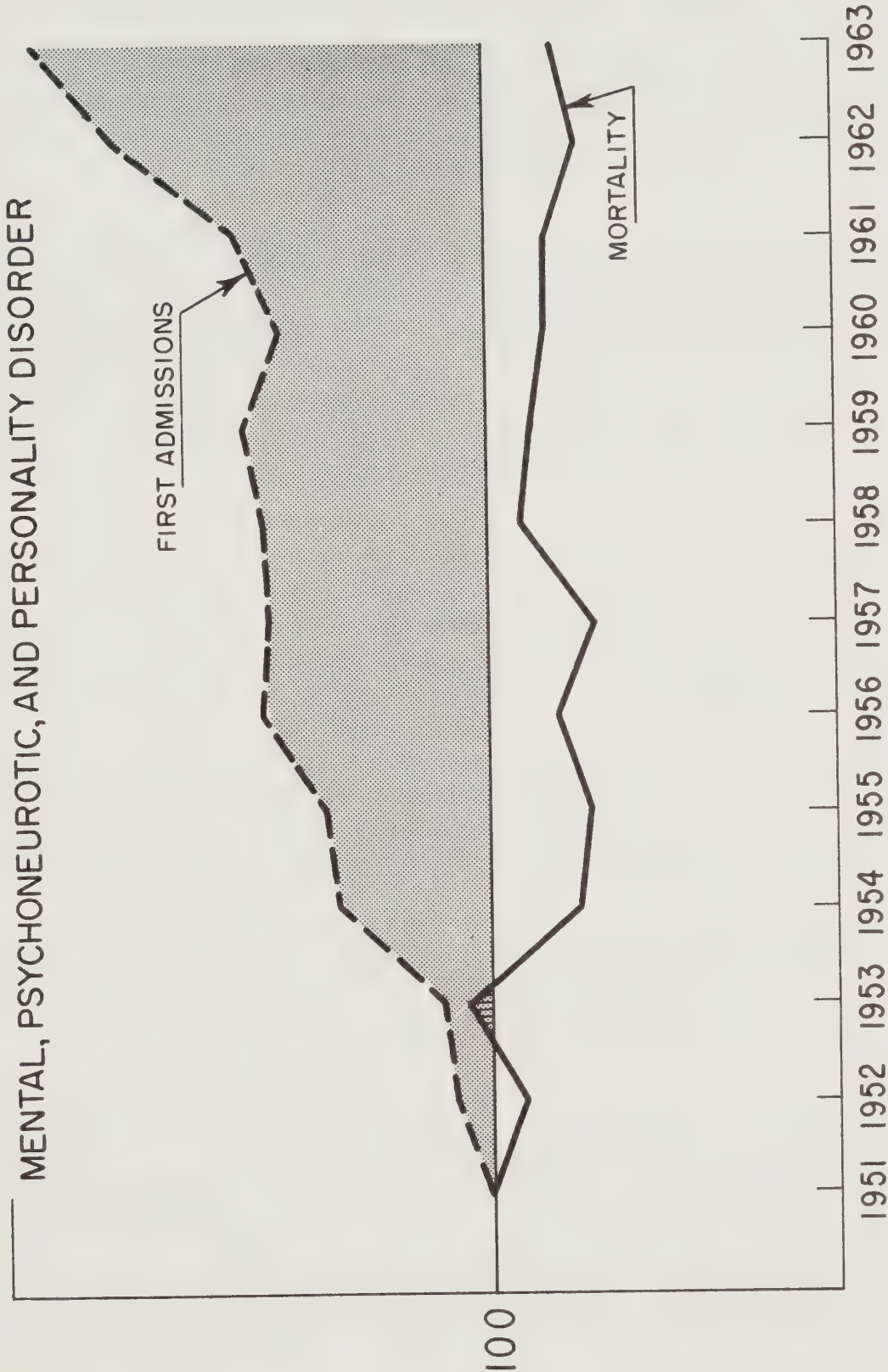
³ This estimate, often heard in Canada and the United States, is considered to be a "very conservative one" in: Tyhurst, J.S., et al., More for the Mind, Toronto: The Canadian Mental Health Association 1963, p. 9.

⁴ The Canadian Mental Health Association, op. cit., Appendix 3.

⁵ Ibid., this estimate results in a total of over 100,000 retarded children and adolescents in Canada.

FIGURE — 19

PERCENTAGE CHANGE IN RATES OF MORTALITY AND FIRST ADMISSIONS
1951—1963



Source: Table 33.

of employees, a highly selected population group, it has been found that psychiatric disorders account for about 6 per cent of all sickness absenteeism.¹ All these are estimates of different aspects of psychiatric disorder among the population, which may serve to indicate the magnitude of the problem though they do not lend themselves to a clear and precise over-all picture.

Lacking the basic data, we do not know the full extent of mental disorder in the community. Our only gauge for past trends have been the first admissions to institutions but these have numerous limitations and reflect changing patterns of services as well as the incidence of diseases.

It would be still more difficult to attempt any projections of future trends and the expected impact on health services, not only because profound changes are taking place in the care of mental disorder but also because the whole concept of mental disorder is changing. On the one hand, there is a tendency to draw more and more types of what previously would have been considered as social maladjustment into the sphere of psychiatric care: alcoholism is one example. Drug addicts are being moved from jails to hospitals or clinics, and other kinds of social offenders may follow. Psychiatric treatment, on the other hand, has been changing from the purely passive custodial care to active treatment with the resulting demand for substituting care in psychiatric units of general hospitals and in the community for that in mental institutions for a sizeable portion of the mentally ill. Nor is the borderline between health maintenance, prevention, treatment, and rehabilitation more fluid in any other health field than in this area of mental, psychiatric and personality disorders.

The best available indications of the extent of psychiatric disorder in Canada are contained in the study undertaken by A. Richman on behalf of the Royal Commission on Health Services.² Richman introduces his observations, however, by the statement that reliable information is lacking:

"In addition to the severe psychiatric illnesses requiring hospital care, and psychiatric illnesses treated by psychiatrists in the community, there is a large burden of emotional symptoms and minor psychiatric illnesses, which come to the attention of the family physicians. The extent of psychological disability in the general population is high, but no reliable data exist on the nature and characteristics of this disability."³

There is, however, some information available now to supplement that for patients in institutions which has never been an adequate measure of incidence or prevalence, and is less so now in view of the newly developing patterns of care. Richman presents this profile of the situation in Canada:

"At any moment four out of 1,000 Canadians are hospitalized in psychiatric institutions. In areas with a relative concentration of psychiatric facilities, more than 20

¹ Generally speaking, absences of over 3 days duration. Dominion Bureau of Statistics, *Illness in the Civil Service*, Statistical Report, 1960, Ottawa: Queen's Printer, 1962, p. 30.

² Richman, A., *Psychiatric Care in Canada: Extent and Results*, study prepared for the Royal Commission on Health Services, Ottawa: Queen's Printer, 1966.

³ *Ibid.*, Chap. 1.

per 1,000 adult population received psychiatrists' care within a three-year period. In one prepaid medical insurance plan, 20 per 1,000 of the middle-aged female members received psychiatrists' care within a one-year period. In a second medical insurance plan, 60 to 70 per 1,000 of middle-aged females were recorded as having a psychiatric illness during one year by family physicians. In a third plan between 80 to 400 per 1,000 females were recorded by family physicians as having a psychiatric illness during a two-year period. It is estimated that for every case recorded as a psychiatric illness by a physician, there are two cases recognized as having psychiatric disability which are not recorded. The frequency of psychiatric disability unrecognized by physicians is not known. The over-all frequency of various forms of psychiatric disability at any one time is high, and the frequency of disability at some time during the lifetime of a population is even higher."¹

In these estimates allowance must be made for a certain amount of overlapping and also for the variations in the concept, definition, and diagnosis of psychiatric disorder. If we have referred to the difficulty of clearly and objectively observing various aspects of illness, this applies especially to psychiatric disorders. From Richman's study of specific programmes which, of course, comprise selected population groups, it would seem that about 3 per cent of the population may be expected to have psychoneuroses recorded; there may be additional cases not thus recorded.²

The extent of alcoholism and drug addiction is discussed in Chapter 3.

In delineating the field of psychiatric disorder reference has been made to the statement that delinquency is a bio-psycho-social phenomenon but it remains difficult to identify the role played by each of these three components: one often leads to the other. Gibbens offers the following as an example of biological factors predisposing for delinquency among young persons:

"One biological feature, which has aroused a good deal of interest, is the observation that in many countries youths are reaching their maximum height at an earlier age and that lately the average age of puberty has been going down at the rate of about half a year every ten years. It is generally assumed that this is related to better nutrition. At the same time, the tendency is to regard young people as psychologically immature to a higher age than formerly. The possible significance of the widening gap between early physical maturity and later psychological maturity is freely discussed."³

While it is recognized that delinquency often contains at least an element of ill health, particularly psychiatric disorder, there is some suggestion that delinquency and psychiatric disorder are supplementary in a way or alternative manifestations of the same basic biological, psychological, or social maladjustment, Gibbens quotes Penrose as having shown:

"That for most countries there is an inverse relationship between persons in prisons and persons in mental hospitals. Where the mental hospital population is large, the prison population is small and vice versa."⁴

¹ Ibid.,

² Ibid., Chap. 5.

³ Gibbens, T.C.N., "Trends in Juvenile Delinquency", Public Health Papers 5, Geneva: World Health Organization, 1961, p. 19.

⁴ Ibid., p. 21.

“It is arguable”, Gibbens states, “whether elimination of delinquency in the present state of society would not generate more intractable disorders.”¹ The same author stresses the importance of the medical services in the prevention or early recognition and remedy of maladjustment of any kind because “the first officials to visit the newborn child are the health visitors”, followed at a later stage by school health personnel.²

Statistical Summary

Mean Age at Death from Mental, Psychoneurotic and Personality Disorders:

Deaths from these disorders numbered 474 in Canada in 1963, a number hardly large enough to draw definite conclusions as to certain characteristics of those affected. It amounts to about one-third of one per cent of all deaths. During the period from 1951 to 1961, when the mean age at death from all causes together had risen from 57.3 to 61.0 (a rise of 6.5 per cent), the corresponding figures for deaths from mental disorders show a decline. Accidents are the only other group where the mean age at death has declined in contrast to the extended life span for all other disease groups. For mental disorders the decline may be accounted for by death now being limited to the more serious cases while the survivors die of other causes. The mean age was as follows for deaths from mental disorders:

| | <u>1951</u> | <u>1961</u> | <u>Per Cent Decrease</u> |
|------------|-------------|-------------|--------------------------|
| Both sexes | 56.9 | 47.6 | 16.3 |
| Male | 56.7 | 46.0 | 18.9 |
| Female | 57.0 | 50.0 | 12.3 |

Incidence and Prevalence of Mental, Psychoneurotic, and Personality Disorders according to the Canadian Sickness Survey 1950-51, and International Comparisons:

No data on the incidence or prevalence of mental disorders are available from the Canadian Sickness Survey. This Survey was designed to yield information on illness from all causes and mental disorders were not specifically excluded. The response in this area was negligible, however, and no attempt was made to obtain adequate data because it was felt that this kind of survey would not be suited for the purpose. For similar reasons, data are lacking for international comparisons.

Mental, Psychoneurotic and Personality Disorders and their Share of Total Illness and Health Care:

The only aspect of mental disorder on which we have data with some degree of reliability and completeness is the amount of institutional care and the small amount of mortality ascribed to these diseases. Thus, no estimate could be made of the duration of illness outside hospitals. The amount shown for disabling illness reflects only the time spent in institution which leads, of course, to a gross understatement of the impact of these disorders.

¹ Ibid.

² Ibid., p. 45.

This entire group of diseases accounted for the following percentages of total illness and the demand for selected health services:

| | Per Cent |
|----------------------------------|----------|
| All deaths | 0.3 |
| Premature mortality | 0.5 |
| Disabling illness | 9.9 |
| Non-disabling illness | n.a. |
| Hospital separations | 1.3 |
| Hospital days | 38.9 |
| Physicians' services | 1.7 |
| Prescriptions (outside hospital) | 3.7 |
| Home nursing | 0.7 |

DISEASES OF THE NERVOUS SYSTEM AND SENSE ORGANS

This group contains several diseases which are important as causes of death. Among them are conditions often referred to as “stroke”, cerebral hemorrhage, embolism, and thrombosis; crippling and disabling diseases such as multiple sclerosis, various forms of paralysis, epilepsy, and others; and the eye and ear diseases.

Accordingly, the group ranks fairly high as a cause of death and illness and in terms of its demand on hospital and other health services. The first-mentioned diseases in the group, the vascular lesions, are often combined with diseases of the heart into the cardiovascular group of diseases as typical forms of the degenerative diseases among the older population groups.

The trend in mortality and hospitalization during the period 1951 to 1963 is indicated in Table 34 and Figure 20 which show both indices at the end of the period as being well above the level in 1951, although mortality has levelled off and even somewhat declined after the sharp rise earlier in that period.

The vascular lesions affecting the central nervous system, which include strokes, accounted for 15,410 deaths in 1963, that is 90 per cent of all deaths ascribed to this group of diseases. The death rate from these lesions per 100,000 population was somewhat higher (85.8) for females than for males (77.4) in 1963,¹ but this is a crude rate and thus affected by the age distribution. Of the deaths 98 per cent occurred at ages 45 and over, and 75 per cent at ages 70 and over.²

Stroke, along with heart disease and cancer, has been the subject of intensive study recently in the United States by the President’s Commission on Heart Disease, Cancer and Stroke. The Report, which culminates in recommendations for a national network for patient care, research, and teaching, contains the following observations regarding the extent of the problem:

¹ Dominion Bureau of Statistics, Vital Statistics 1963, Ottawa: Queen’s Printer, 1965, pp. 118, 119.

² Based on *ibid.*, p. 133.

“To a greater extent than heart disease and cancer, stroke is a disease of the aged. About 80 per cent of the deaths occurred among people aged 65 and over. The largest single number of deaths occurred in the 75-84 group.

Looking not only at percentages but also at the number of deaths at various age groups, there are numerically enough deaths occurring in the most productive years of life to make stroke important during this period also.

Unlike heart disease and cancer, stroke causes more female than male deaths.

About 8 of every 10 stroke victims survive the acute initial phase of the disease. Most of them live for years thereafter - usually in a seriously disabled condition.”¹

While the vascular lesions account for most of the mortality from the diseases in this group and for about one-fourth of the duration of hospitalization, they share the frequency of hospitalization (separations) about equally with the eye diseases and the ear diseases. The latter, however, account for more than half of the prescriptions in this group.

TABLE 34
DISEASES OF THE NERVOUS SYSTEM,
RATES OF MORTALITY AND HOSPITAL SEPARATIONS, AND INDICES,
CANADA, 1951-1963

| Year | Deaths | | Hospital Separations | |
|-----------|--|------------------------------------|--|------------------------------------|
| | Rate per 100,000 Population ¹ | Per Cent of 1951 ¹ Rate | Rate per 100,000 Population ² | Per Cent of 1951 ¹ Rate |
| 1951..... | 62.4 | 100.0 | 640 | 100.0 |
| 1952..... | 61.7 | 98.9 | 662 | 103.4 |
| 1953..... | 80.8 | 129.5 | 623 | 97.3 |
| 1954..... | 101.8 | 163.1 | 604 | 94.4 |
| 1955..... | 101.9 | 163.3 | 601 | 93.9 |
| 1956..... | 100.8 | 161.5 | 609 | 95.2 |
| 1957..... | 102.1 | 163.6 | 649 | 101.4 |
| 1958..... | 98.5 | 157.9 | 649 | 101.4 |
| 1959..... | 99.3 | 159.1 | 910 | 142.2 |
| 1960..... | 96.0 | 153.8 | 930 | 145.3 |
| 1961..... | 93.5 | 149.8 | 970 | 151.6 |
| 1962..... | 91.6 | 146.8 | 970 | 151.6 |
| 1963..... | 90.7 | 145.4 | 1,000 | 156.3 |

¹ Dominion Bureau of Statistics, annual reports of Vital Statistics, Ottawa: Queen’s Printer, various years.

² Department of Public Health, annual reports of Saskatchewan Hospital Services Plan, Regina: Queen’s Printer, various years.

³ The sudden rise is due to a change in classification. From 1951 to 1958 the rates cover only categories C20-C22 of the International Classification of Diseases.

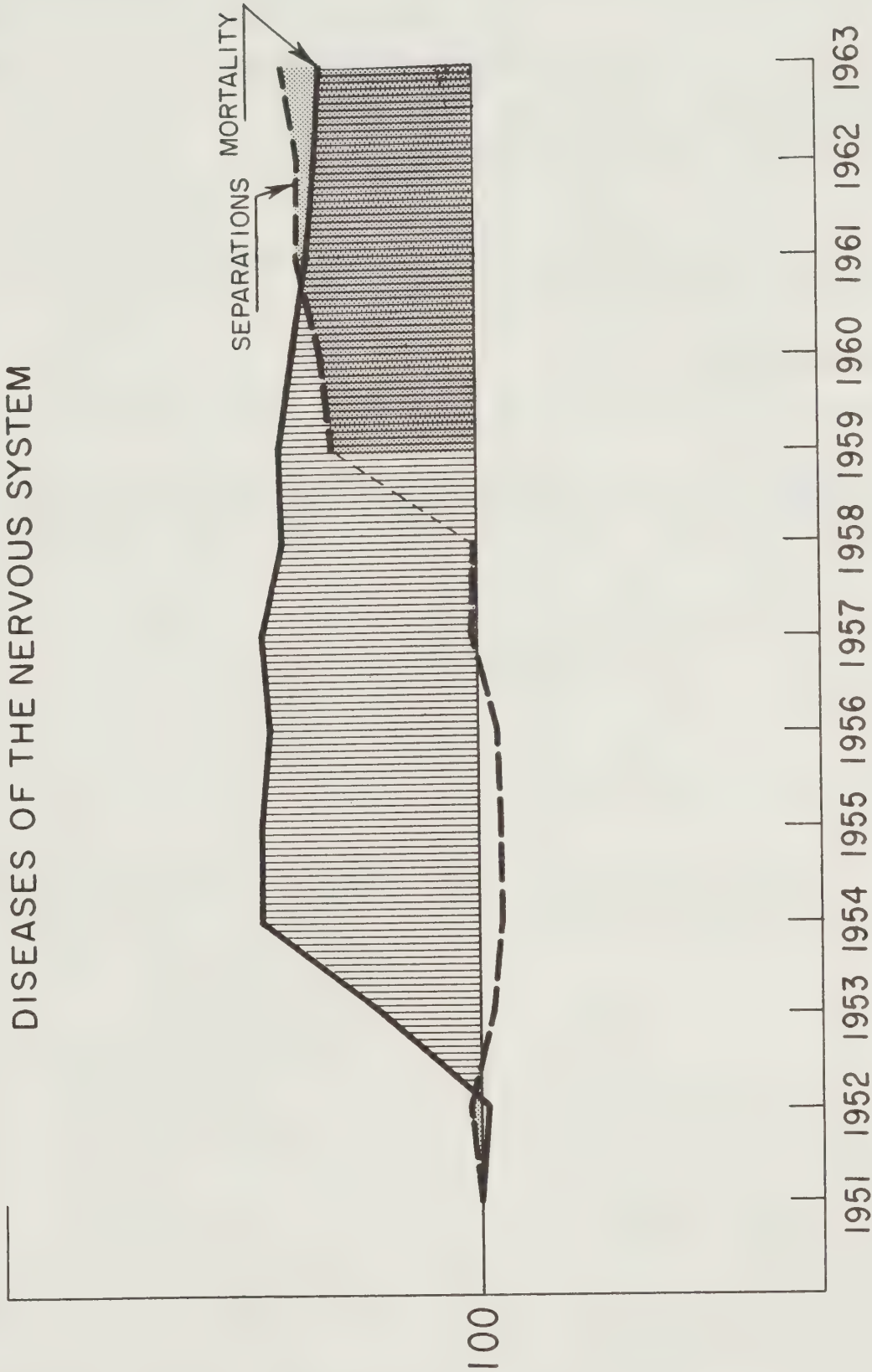
¹ President’s Commission on Heart Disease, Cancer and Stroke, A National Program to Conquer Heart Disease, Cancer and Stroke, Vol. 1, Washington: U.S. Government Printing Office 1964, p. 12.

FIGURE — 20

PERCENTAGE CHANGE IN RATES OF MORTALITY AND HOSPITAL SEPARATIONS

1951 — 1963

DISEASES OF THE NERVOUS SYSTEM



BREAK DUE TO CHANGES IN CLASSIFICATION

Source: Table 34.

Hospital separations and days of hospital care are distributed as follows among the vascular lesions, diseases of the eye, and diseases of the ear (rates per 100,000 population):

| | <u>Hospital Separations</u> | <u>Hospital Days</u> |
|------------------|-----------------------------|----------------------|
| Vascular lesions | 174 | 7,290 |
| Diseases of eye | 198 | 1,706 |
| Diseases of ear | 151 | 1,182 |

The extent of blindness and deafness will be discussed together with other impairments in the later part of this chapter.

Statistical Summary

Mean Age at Death from Diseases of the Nervous System and Sense Organs:

During the period from 1951 to 1961, when the mean age at death from all causes had risen from 57.3 to 61.0 (a rise of 6.5 per cent), the corresponding figures for deaths from the diseases of the nervous system and sense organs were:

| | <u>1951</u> | <u>1961</u> | <u>Per Cent Increase</u> |
|------------|-------------|-------------|--------------------------|
| Both sexes | 68.6 | 72.1 | 5.0 |
| Male | 67.5 | 70.8 | 4.9 |
| Female | 69.7 | 73.2 | 5.0 |

Incidence and Prevalence of Diseases of the Nervous System and Sense Organs according to the Canadian Sickness Survey 1950-51:

| | <u>Persons Developing New Illness during Year, per 100,000 Population</u> | <u>Persons Sick Any Day, per 100,000 Population</u> |
|---|---|---|
| All Diseases of Nervous System and Sense Organs..... | 6,370 | 950 |
| Migraine | -- | 20 |
| Vascular lesions, epilepsy and other diseases of brain and spinal cord..... | -- | 230 |
| Neuralgia and neuritis | 820 | 160 |
| Conjunctivitis and ophthalmia | 370 | 10 |
| Hordeolum and other inflammatory eye diseases..... | 1,730 | 130 |
| Other diseases of eye | 470 | 220 |
| Otitis and mastoiditis | 460 | 30 |
| Other diseases of ear..... | 2,490 | 140 |

Vascular Lesions in Canada and Selected Other Countries:

The Canadian death rate from these diseases was lower in 1959 than that of the United States, England and Wales, France and Sweden. These are crude rates, not adjusted for the varying age distribution.

| <u>Country</u> | <u>Death Rate per 100,000 Population (1959)</u> |
|-------------------|---|
| Canada | 89.7 |
| United States | 108.5 |
| England and Wales | 165.6 |
| France | 136.4 |
| Sweden | 137.9 |
| Mexico | 18.5 |
| Ceylon | 9.4 |

Diseases of the Nervous System and Sense Organs and Their Share of Total Illness and Health Care:

The diseases in this group caused 17,102 deaths in 1961, of which 15,428 were due to vascular lesions affecting the central nervous system. This amounts to 12 per cent of all deaths. The percentage of life years lost due to premature mortality is somewhat lower, however, because most of the deaths occur at an advanced age. Only 3.9 per cent of all physicians' services, but 11 per cent of home nursing services, is due to these diseases. This reflects the age of the patients, the generally high degree of disability, and the need for whatever rehabilitation can be achieved.

The following tabulation will allow a comparison of the percentages of total illness and the demand for services accounted for by this entire group of diseases:

| | <u>Per Cent</u> |
|-----------------------|-----------------|
| All deaths | 12.1 |
| Premature mortality | 7.4 |
| Disabling illness | 6.3 |
| Non-disabling illness | 5.6 |
| Hospital separations | 3.8 |
| Hospital days | 5.0 |
| Physicians' services | 3.9 |
| Prescriptions | 5.3 |
| Home nursing | 11.0 |

DISEASES OF THE CIRCULATORY SYSTEM

Included in this group are the various types of heart disease, hypertension, arteriosclerosis and other diseases of veins and arteries. Because these diseases are related, and have a natural history somewhat similar to that of the vascular

lesions, discussed in the foregoing, and kidney disease, diseases of the circulatory system are sometimes combined for purposes of analysis with the vascular lesions to form the cardiovascular group, and sometimes also with kidney disease as the cardiovascular-renal group. In this study, however, these three groups are treated separately.

The circulatory diseases represent one of the major health problems measured by any of the criteria at our disposal: mortality, illness, and the demand on health care.

The death rate has been consistently high with only a very slight reduction noticeable during the last decade. The rise displayed by the index of hospital separations may reflect the increasing means of effective treatment and postponing fatality.

Table 35 and Figure 21 show these trends for the period from 1951 to 1963.

TABLE 35
DISEASES OF THE CIRCULATORY SYSTEM,
RATES OF MORTALITY AND HOSPITAL SEPARATIONS, AND INDICES,
CANADA, 1951-1963

| Year | Deaths | | Hospital Separations | |
|-----------|--|-----------------------|--|-----------------------|
| | Rate per 100,000 Population ¹ | Per Cent of 1951 Rate | Rate per 100,000 Population ² | Per Cent of 1951 Rate |
| 1951..... | 312.2 | 100.0 | 1,068 | 100.0 |
| 1952..... | 311.3 | 99.7 | 1,167 | 109.3 |
| 1953..... | 307.9 | 98.6 | 1,161 | 108.7 |
| 1954..... | 298.9 | 95.7 | 1,159 | 108.5 |
| 1955..... | 301.0 | 96.4 | 1,183 | 110.8 |
| 1956..... | 301.7 | 96.6 | 1,231 | 115.3 |
| 1957..... | 302.3 | 96.8 | 1,183 | 110.8 |
| 1958..... | 296.6 | 95.0 | 1,257 | 117.7 |
| 1959..... | 303.1 | 97.1 | 1,720 ³ | 161.0 |
| 1960..... | 302.7 | 97.0 | 1,790 | 169.6 |
| 1961..... | 300.4 | 96.2 | 1,780 | 166.7 |
| 1962..... | 301.1 | 96.4 | 1,760 | 164.8 |
| 1963..... | 302.1 | 96.8 | 1,780 | 166.7 |

¹ Dominion Bureau of Statistics, annual reports of Vital Statistics, Ottawa: Queen's Printer, various years.

² Department of Public Health, annual reports of Saskatchewan Hospital Services Plan, Regina: Queen's Printer, various years.

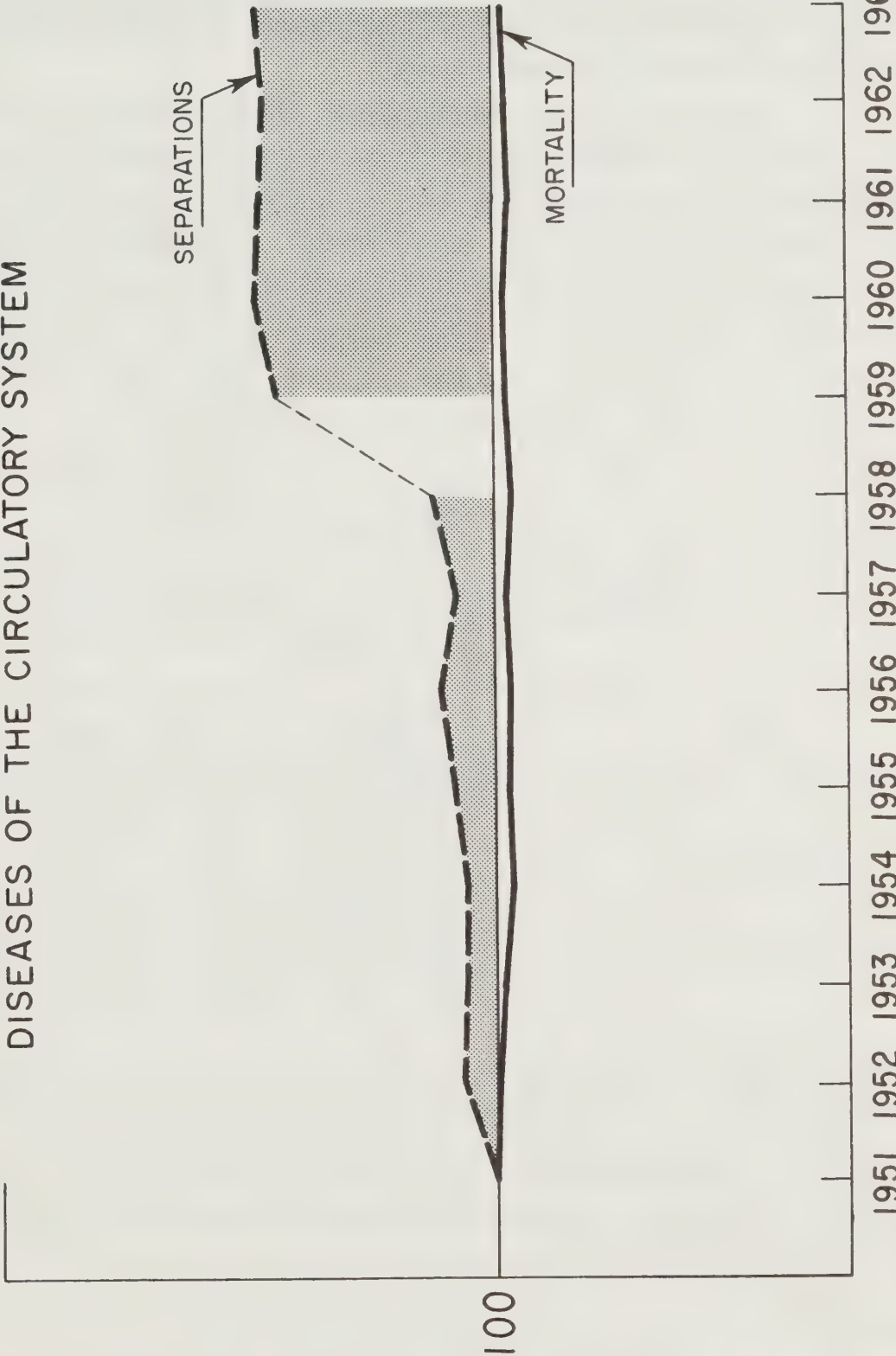
³ The sudden rise is due to a change in classification. From 1951 to 1958 the rate covers only categories C23 to C27 of the International Classification of Diseases.

FIGURE —21

PERCENTAGE CHANGE IN RATES OF MORTALITY AND HOSPITAL SEPARATIONS

1951-1963

DISEASES OF THE CIRCULATORY SYSTEM



BREAK DUE TO CHANGES IN THE CLASSIFICATION

Source: Table 35.

These statistics are indicative generally of the extent and distribution of the circulatory diseases. The Canadian Sickness Survey referred to below was a household interview survey where information was obtained mostly by lay interviewers from the householder, without medical opinion or examination. For the first time data on the prevalence of heart disease have now become available from a health examination survey in the United States, where a nation-wide sample of adults aged 18-79 years was medically examined and tested. Here are some of the statistics derived from that survey:¹

Prevalence per 100,000 Population of Definite and Suspect
Heart Disease in Adults, by Diagnosis and Sex,
United States 1960-62

| Diagnosis | Both Sexes | | Male | | Female | |
|-------------------|------------|---------|----------|---------|----------|---------|
| | Definite | Suspect | Definite | Suspect | Definite | Suspect |
| Total..... | 13,200 | 11,700 | 12,600 | 13,900 | 13,700 | 9,700 |
| Hypertensive..... | 9,500 | 4,300 | 7,700 | 4,800 | 11,100 | 3,300 |
| Coronary..... | 2,800 | 2,200 | 3,700 | 2,200 | 2,000 | 2,200 |
| Rheumatic..... | 1,100 | -- | 1,200 | 7,800 | 1,100 | 5,500 |
| Congenital..... | 200 | -- | 300 | | 100 | |
| Syphilitic..... | 100 | -- | 200 | | 100 | |
| Other..... | 300 | 6,600 | 200 | | 300 | |

Prevalence per 100,000 Population of Definite and Suspect
Heart Disease in Adults, by Age and Sex,
United States 1960-62

| Age | Both Sexes | | Male | | Female | |
|------------------|------------|---------|----------|---------|----------|---------|
| | Definite | Suspect | Definite | Suspect | Definite | Suspect |
| Total 18-79..... | 13,200 | 11,700 | 12,600 | 13,900 | 13,700 | 9,700 |
| 18-24..... | 1,200 | 4,000 | 1,400 | 6,400 | 1,100 | 2,000 |
| 25-34..... | 2,400 | 4,900 | 2,900 | 6,600 | 2,000 | 3,300 |
| 35-44..... | 6,700 | 8,800 | 7,400 | 11,400 | 6,100 | 6,400 |
| 45-54..... | 13,200 | 15,300 | 13,800 | 18,300 | 12,500 | 12,400 |
| 55-64..... | 25,300 | 19,400 | 24,200 | 18,500 | 26,200 | 20,100 |
| 65-74..... | 39,900 | 20,700 | 33,200 | 25,300 | 45,200 | 17,100 |
| 75-79..... | 42,300 | 25,200 | 38,800 | 27,100 | 45,800 | 23,300 |

In a longitudinal study of coronary heart disease in Canada, albeit of a highly selected population group (pilots and pilot trainees), Mathewson and his co-workers² established a similar rise in the incidence rate with increasing age (though, as expected, at a lower level in this particular group than figures for the general population). In this group, the manifestations of coronary heart disease among 143 cases were found to be distributed as follows:³

¹ Based on United States Public Health Service, Heart Disease in Adults, United States 1960-1962, National Center for Health Statistics, Series 11, No. 6, Washington: U.S. Government Printing Office 1964.

² Mathewson, F.A.L., "The University of Manitoba Follow-up Study: A Prospective Investigation of Cardiovascular Disease, Part I", Canadian Medical Association Journal, May 1, 1965, pp. 947-953.

³ Based on *ibid.*, p. 951.

| | Per Cent |
|--|-----------|
| Myocardial infarction | 49 |
| Myocardial ischemia | 17 |
| Angina pectoris | 19 |
| Good health, sudden death | 12 |
| Marked coronary atherosclerosis at autopsy | 2 |
| Death certificate only | 1 |
| | <hr/> 100 |

There was one case with positive exertion test.

Heart disease is not entirely a problem of middle and old age. An analysis of the records of the City of Toronto Heart Registry reveals the following prevalence rates (per 100,000 population) of heart disease in Toronto pre-school and school children:¹

| Classification | Rate per 100,000 | |
|--|------------------|-------------|
| | Age 0-15 | Age 5-15 |
| Number with heart disease | 345.7 | 324.8 |
| Congenital heart disease | 295.9 | 257.3 |
| Rheumatic heart disease | 43.4 | 64.6 |
| Other heart disease | 6.4 | 2.9 |
| Rheumatic fever without heart disease | 102.1 | 156.5 |
| Possible rheumatic fever without heart disease | 20.4 | 30.3 |
| Rheumatoid arthritis without heart disease | 12.1 | 17.6 |
| Functional heart murmur | 155.6 | 218.2 |
| Other cases referred to registry | 13.4 | 17.6 |
| Total cases on registry | 649.3 | 765.0 |

The very substantial excess of mortality from the circulatory diseases among males accounts for a large part of the previously observed generally higher mortality and shorter life expectancy among males. The next question is, of course: Why the higher mortality from circulatory diseases among men? One opinion runs like this:

“One hypothesis often advanced to account for these widening sex differentials, especially in arteriosclerotic heart and coronary artery disease, attempts to combine both biological and sociological factors. Under it, men are thought to be particularly subject, and also perhaps particularly vulnerable, to the strains and pressures of modern life. These strains and pressures are presumed to be etiologically important in causing the disease, although the precise mechanism, or chain of causality, is as yet unclear.”²

But then there was the study of mortality among male and female members of religious orders where both are thought to be equally free of or burdened with the

¹ Rose, V., et. al., “Incidence of Heart Disease in Children in the City of Toronto”, Canadian Medical Association Journal, July 8, 1964, p. 96.

² Health Information Foundation, “Recent Patterns in Heart Disease”, *Progress in Health Services*, November-December 1962, p. 4.

stresses of life, and which also showed an excess of male mortality.¹ Strangely also, morbidity surveys show higher rates among females which can be traced largely to hypertensive disease. For heart disease generally, prevalence rates rise more rapidly with age among women than among men, as shown in the foregoing table.

In commenting on the results of the United States examination survey, the reports refer to the substantial number of cases with a possible multiple diagnosis under several types of heart disease.² For example, among persons with suspect hypertensive heart disease are some with only marginal, others with very definite evidence of heart disease. Of the persons with definite hypertensive heart disease 89 per cent would be considered to have heart disease even in the absence of hypertension. About 41 per cent of all definite cases of coronary heart disease had coexisting hypertensive heart disease or some other specific heart disease. "In short", the report concludes, "heart disease is very often a complex, multifaceted disease entity, inadequately displayed by the rubrics in current use".³ This is a thought which also has to be considered in the interpretation of mortality statistics which are based on one selected underlying cause.

While prevalence and mortality are highest among the oldest age groups, the rates show a considerable increase beginning during middle age. It is also true, however, that most people who have had a heart attack in middle life are able to resume work after recovery, though some may have to adjust to another type of work.⁴ This emphasizes the need for prompt medical care and supervision, and particularly also rehabilitation.

Among environmental causative factors of cardiovascular mortality, apart from those already mentioned, are possibly air pollutants, nutrition, and also elevation above sea level.⁵ In the United States a definite geographic pattern, persistent through the years, has been observed: low rates in the western plains with a few in the middle south; high rates near the East Coast, Gulf, and Great Lakes.⁶

The President's Commission on Heart Disease, Cancer and Stroke in the United States, having reviewed the extent of the problem, concludes that further research in the field of heart disease is necessary before genuine control can be achieved but that much can be done if present knowledge were more widely applied: "meanwhile, substantial reduction of the toll of heart disease awaits a major nation-wide effort to apply what is already known".⁷

¹ See Chapter 6.

² United States Public Health Service, *Heart Disease in Adults*, op. cit., pp. 9 and 11.

³ Ibid., p. 11.

⁴ "Heart Disease in Middle Life", *Statistical Bulletin*, Metropolitan Life Insurance Company, February 1959, p. 3.

⁵ Saver, H., "Epidemiology of Cardiovascular Mortality — Geographic and Ethnic", *American Journal of Public Health*, January 1962, p. 103.

⁶ Ibid., p. 104.

⁷ President's Commission on Heart Disease, Cancer and Stroke, op. cit., p. 7.

White and Ibrahim studied the proportion of cardiovascular disease coming to the attention of physicians in various settings.¹ They conclude, based on a year-prevalence of heart disease and hypertension of 15,000 per 100,000 population, that of these 15,000 only 6,000 recognize their condition, 4,000 visit a physician, 400 are hospitalized, 50 are referred to another physician and 20 to a university medical centre.

Statistical Summary

Mean Age at Death from Diseases of the Circulatory System:

During the period from 1951 to 1961, when the mean age at death from all causes had risen from 57.3 to 61.0 (a rise of 6.5 per cent), the corresponding figures for deaths from diseases of the circulatory system were:

| | 1951 | 1961 | Per Cent Increase |
|------------|------|------|-------------------|
| Both sexes | 70.8 | 72.1 | 1.8 |
| Male | 69.2 | 70.0 | 1.2 |
| Female | 73.0 | 75.3 | 3.2 |

Incidence and Prevalence of Diseases of the Circulatory System according to the Canadian Sickness Survey 1950–51:

| | Persons Developing New Illness during Year, per 100,000 Population | Persons Sick Any Day per 100,000 Population |
|--|--|---|
| All Diseases of Circulatory System..... | 1,890 | 1,690 |
| Diseases of heart without hypertension, rheumatic fever..... | 670 | 640 |
| Hypertensive disease..... | 400 | 460 |
| Varicose veins of lower extremities | -- | 250 |
| Haemorrhoids, phlebitis, and other diseases of veins | 360 | 130 |
| Arterial and other diseases of circulatory system | 420 | 210 |

Certain Diseases of the Circulatory System in Canada and Selected Other Countries:

The comparison with selected other countries shows Canada’s mortality rate lower than that of the United States, England and Wales, and Sweden, but somewhat higher than that of France and substantially higher than those for Mexico and Ceylon. Differences in the age composition of the respective populations have to be taken into account in interpreting these figures.

¹ White, K.L., Ibrahim, M.A., “The Distribution of Cardiovascular Disease in the Community” Annals of Internal Medicine, April 1963, p. 633.

| | Death Rate per 100,000 Population for Categories B24- B29 of the International Classification |
|-------------------|--|
| Canada | 273.1 |
| United States | 370.7 |
| England and Wales | 385.8 |
| France | 214.8 |
| Sweden | 307.9 |
| Mexico | 72.2 |
| Ceylon | 60.7 |

Diseases of the Circulatory System and Their Share of Total Illness and Health Care:

The diseases of the circulatory system account for about 40 per cent of all deaths, by far the highest percentage of all disease groups. They are followed by the malignant neoplasms which account for about 17 per cent of all deaths. Although death from the circulatory diseases usually occurs at an advanced age, the sheer number of deaths also makes it the leading cause group in regard to life years lost due to premature death. Their reported share in disabling and non-disabling illness is about one-tenth of the total from all causes (9.1 and 10.6 respectively).

In terms of hospitalization, this group ranks second, after the mental diseases, with 7.9 per cent with the latter taking up almost 40 per cent of all hospital days. It ranks second highest in the requirement for physicians' services and prescriptions.

Within this group of diseases, arteriosclerotic and degenerative heart disease account for almost 80 per cent of the deaths.

Following are the percentages accounted for by this group of total illness and the demand for selected services:

| | Per Cent |
|-----------------------|----------|
| All deaths | 38.8 |
| Premature mortality | 22.0 |
| Disabling illness | 9.1 |
| Non-disabling illness | 10.6 |
| Hospital separations | 6.4 |
| Hospital days | 7.9 |
| Physicians' services | 5.2 |
| Prescriptions | 16.2 |
| Home nursing | 11.9 |

DISEASES OF THE RESPIRATORY SYSTEM

Among the diseases in this group are the common cold, influenza, bronchitis, pneumonia, tonsillitis and other diseases related to the respiratory tract. All forms of tuberculosis are included under the Infective and Parasitic Diseases, and cancer of the respiratory system under Neoplasms.

The trend in the mortality from these diseases and their hospitalization from 1951 to 1963 is shown in Table 36 and Figure 22.

TABLE 36
DISEASES OF THE RESPIRATORY SYSTEM, RATES OF MORTALITY
AND HOSPITAL SEPARATIONS AND INDICES,
CANADA, 1951-1963

| Year | Deaths | | Hospital Separations | |
|-----------|--|-----------------------------|--|-----------------------------|
| | Rate per 100,000 Population ¹ | Per Cent of 1951 Rate | Rate per 100,000 Population ² | Per Cent of 1951 Rate |
| 1951..... | 64.6 | 100.0 | 4,239 | 100.0 |
| 1952..... | 48.5 | 75.1 | 4,117 | 97.1 |
| 1953..... | 52.4 | 81.1 | 4,176 | 98.5 |
| 1954..... | 44.2 | 68.4 | 3,948 | 93.1 |
| 1955..... | 47.3 | 73.2 | 3,728 | 87.9 |
| 1956..... | 49.3 | 76.3 | 3,511 | 82.8 |
| 1957..... | 56.6 | 87.6 | 4,324 | 102.0 |
| 1958..... | 48.1 | 74.5 | 3,688 | 87.0 |
| 1959..... | 53.7 | 83.1 | 4,000 | 94.4 |
| 1960..... | 46.4 | 71.8 | 4,110 | 97.0 |
| 1961..... | 44.0 | 68.1 | 3,900 | 92.0 |
| 1962..... | 44.8 | 69.3 | 3,860 | 91.1 |
| 1963..... | 52.0 | 80.5 | 4,540 | 107.1 |

¹ Dominion Bureau of Statistics, annual reports of Vital Statistics, Ottawa: Queen's Printer, various years.
² Department of Public Health, annual reports of Saskatchewan Hospital Services Plan, Regina: Queen's Printer, various years.

In both series the rates have remained below the 1951 figures (except for hospital separations in 1957). There is, however, no continuous trend because the most frequent of these diseases (common cold, influenza and complications) are subject to epidemic outbreaks. In fact, 1951, the initial year of this period, was a year of a widespread Asian influenza epidemic which brought the incidence of related respiratory disorders and their complications to a high level.

There is evidence that new drugs and treatment methods have succeeded in substantially reducing mortality from respiratory diseases as shown by the following figures for the period prior to 1951.

Death Rates from Influenza, Bronchitis and Pneumonia Combined,
Canada 1926-1950

| Average 1926-30 | Average 1931-35 | Average 1936-40 | Average 1941-45 | Average 1946-50 |
|--------------------|--------------------|--------------------|--------------------|--------------------|
| 134.0 | 100.6 | 97.4 | 69.0 | 55.2 |

Source: Dominion Bureau of Statistics, Canadian Vital Statistics Trends, 1921-1954, Reference Paper No. 70, Ottawa: Queen's Printer, 1956, p. 33.

Modern drugs have helped to reduce sharply the more serious effects of illness from respiratory diseases such as pneumonia and bronchitis but these conditions are still very prevalent. A survey in the town of Chilliwack found among the people aged 24 to 74 chronic bronchitis present in 21.5 per cent of men and 11.3 per cent of women. The same survey found more serious obstructive lung disease in 12.6 per cent of men and 8.7 per cent of women.¹ The lowly common cold and the often minor and ill-defined influenza account for much of the duration of illness and disability by their sheer frequency. A longitudinal study carried out at the Harvard School of Public Health led to the following observation regarding the frequency of respiratory illness in boys and girls up to 18 years of age:

"Respiratory illnesses constitute 83 per cent of the number of total illnesses experienced by boys and girls from birth to 18 years. At all age periods the percentages of total illnesses which are respiratory are high. This is strikingly apparent from the following figures given in round numbers: 85, 82, 81, 79 and 91 per cent for boys at the successive age periods of infancy, preschool, school, early and late adolescence were respiratory. For girls, the comparable percentages are 81, 82, 80, 83, and 91 per cent. The lowest percentage of respiratory illnesses was 79 for boys during early adolescence, whereas the highest was 91 for both boys and girls during late adolescence."²

These figures include some allergies but the respiratory infections account for from 93.9 to 99.9 per cent of the total referred to as respiratory illness.³

The Canadian Sickness Survey 1950-51 found that of all days of disability among all age groups 32 per cent were due to respiratory diseases, 23 per cent to the common cold and influenza alone.⁴ Of illness absenteeism in the Federal Civil Service, counting mainly absences of over three days duration, 40 per cent of the illnesses and 21 per cent of days of illness were due to respiratory diseases;⁵ the percentages would likely be larger for the shorter absences where data are not available.

¹ Anderson, D.O., et al., "The Chilliwack Respiratory Survey, 1963: Part III. The Prevalence of Respiratory Disease in a Rural Canadian Town", Canadian Medical Association Journal, May 8, 1965, pp. 1007-1016. (These figures for chronic bronchitis are substantially higher than those found in the household interview survey in the United States.)

² Valadian, I., et al., "Contribution of Respiratory Infections to the Total Illness Experiences of Healthy Children from Birth to 18 Years", American Journal of Public Health, September 1961, p. 1321.

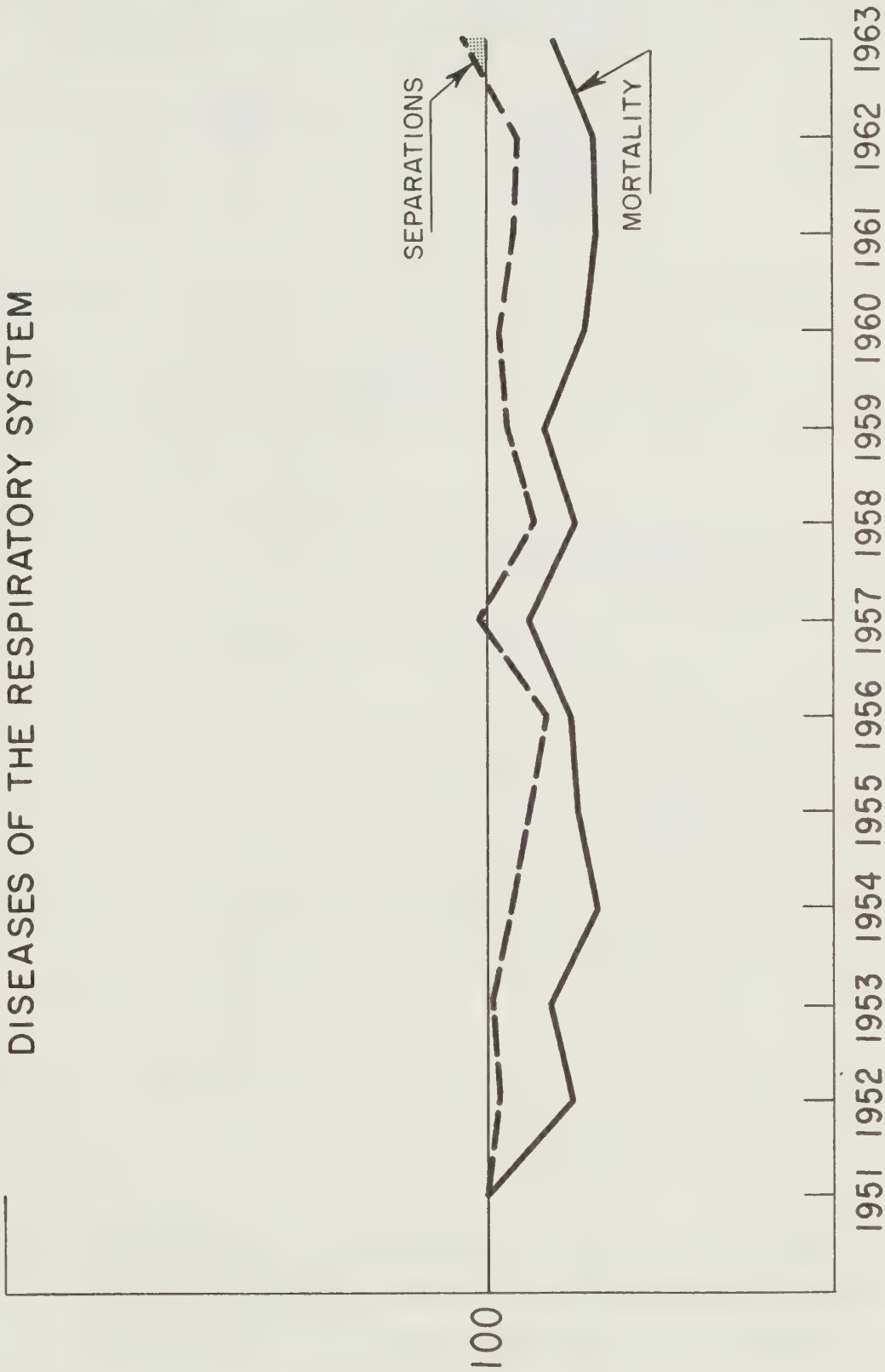
³ Ibid., p. 1323.

⁴ Department of National Health and Welfare and Dominion Bureau of Statistics, op. cit., p. 140.

⁵ Dominion Bureau of Statistics, Illness in the Civil Service — Statistical Report, Ottawa: Queen's Printer, 1964, pp. 30 and 31.

FIGURE — 22

PERCENTAGE CHANGE IN RATES OF MORTALITY AND HOSPITAL SEPARATIONS
1951 — 1963
DISEASES OF THE RESPIRATORY SYSTEM



Source: Table 36.

Statistical Summary

Mean Age at Death from Diseases of the Respiratory System:

During the period from 1951 to 1961, when the mean age at death from all causes had risen from 57.3 to 61.0 (a rise of 6.5 per cent), the corresponding figures for deaths from the diseases of the respiratory system were:

| | 1951 | 1961 | Per Cent Increase |
|------------|------|------|-------------------|
| Both sexes | 48.2 | 55.5 | 15.1 |
| Male | 47.9 | 56.3 | 17.5 |
| Female | 48.6 | 54.4 | 11.9 |

Incidence and Prevalence of Diseases of the Respiratory System According to the Canadian Sickness Survey 1950-51:

| | Persons Developing New Illness during Year, per 100,000 Population | Persons Sick Any Day, per 100,000 Population |
|--|--|--|
| All Diseases of the Respiratory System ... | 65,350 | 4,050 |
| Acute nasopharyngitis (common cold) | 39,840 | 1,780 |
| Acute pharyngitis | 5,970 | 130 |
| Acute tonsillitis, peritonsillar abscess (quinsy) | 900 | 50 |
| Acute laryngitis and tracheitis | 660 | 30 |
| Acute upper respiratory infection of multiple or unspecified sites | 2,150 | 70 |
| Influenza with respiratory and nervous manifestations and influenza unqualified | 34,800 | 1,040 |
| Influenza with digestive manifestations ... | 4,210 | 70 |
| Pneumonia | 950 | 80 |
| Bronchitis | 2,950 | 350 |
| Hypertrophy of tonsils and adenoids | 960 | 80 |
| Chronic sinusitis | 580 | 160 |
| Pleurisy and other diseases of lungs, upper respiratory tract and pleural cavity | 1,140 | 210 |

It should be noted that the period covered by the Canadian Sickness Survey included an influenza epidemic in the first half of the year 1951.

Certain Diseases of the Respiratory System in Canada and Selected Other Countries:

Because of the susceptibility of the diseases of the respiratory system to epidemic outbreaks as well as to environmental and climatic conditions, comparisons with other countries would have to take such factors into account. To be

meaningful, comparisons should extend over a longer period of time. This is to be borne in mind in interpreting the following figures, which include deaths from influenza, pneumonia, and bronchitis:

| | Death Rate per 100,000 (1959) |
|-------------------|----------------------------------|
| Canada | 44.6 |
| United States | 33.4 |
| England and Wales | 139.9 |
| France | 53.9 |
| Sweden | 39.5 |
| Mexico | 220.8 |
| Ceylon | 80.6 |

Diseases of the Respiratory System and Their Share of Total Illness and Health Care:

The respiratory group accounts for about five per cent of all deaths with a somewhat higher proportion of all life years lost in a year due to premature mortality.

The impact of the respiratory diseases, however, lies in their demand on physicians' services, prescriptions, and in their share of disabling and non-disabling illness, rendering them the highest ranking group in these respects. They also account for 14.1 per cent of hospital separations, but only 4.9 per cent of all hospital days and 1.5 per cent of home nursing services.

Among the diseases of the respiratory system, the common cold, influenza and other acute infections of the upper respiratory tract are responsible for about one-fifth of all illness days, disabling and non-disabling; and for about one-tenth of all physicians' services. Hypertrophy of tonsils (tonsillitis) and adenoids account for 6.3 per cent of all general hospital separations, but, because of the generally short stay, for only 1.3 per cent of all general hospital days. There are 1,116 cases per 100,000 population, the rate being highest (5,356) for the four-year olds. Correspondingly, there are 2,359 days per 100,000 population but 9,449 among the four-year olds.

Following are the percentages accounted for by all diseases of the respiratory system out of total illness and total demand for selected services:

| | Per Cent |
|-----------------------|----------|
| All deaths | 5.7 |
| Premature mortality | 7.2 |
| Disabling illness | 28.0 |
| Non-disabling illness | 23.4 |
| Hospital separations | 14.1 |
| Hospital days | 4.9 |
| Physicians' services | 15.1 |
| Prescriptions | 16.7 |
| Home nursing | 1.5 |

DISEASES OF THE DIGESTIVE SYSTEM

This group includes the various diseases of the stomach (except cancer which is included under the Neoplasms), ulcers, appendicitis, hernia, as well as diseases of the liver, gallbladder, and pancreas - a rather heterogeneous group. The International Classification of Diseases also includes dental disorders under this heading; but in view of the fact that most of these disorders come under the care of dentists who form a separate branch within the health services complex, dental disorders will be discussed separately later in this chapter.

Table 37 and Figure 23 indicate a slow decline and then a levelling off in the mortality from diseases of the digestive system between 1951 and 1963, and little change in the frequency of hospitalization.

TABLE 37
DISEASES OF THE DIGESTIVE SYSTEM,
RATES OF MORTALITY AND HOSPITAL SEPARATIONS, AND INDICES,
CANADA, 1951-1963

| Year | Deaths | | Hospital Separations | |
|------------|--|-----------------------|--|-----------------------|
| | Rate per 100,000 Population ¹ | Per Cent of 1951 Rate | Rate per 100,000 Population ² | Per Cent of 1951 Rate |
| 1951 | 33.7 | 100.0 | 2,893 | 100.0 |
| 1952 | 33.4 | 99.1 | 2,991 | 103.4 |
| 1953 | 32.7 | 97.0 | 2,890 | 99.9 |
| 1954 | 30.4 | 90.2 | 2,891 | 99.9 |
| 1955 | 29.8 | 88.4 | 2,820 | 97.5 |
| 1956 | 29.3 | 86.9 | 2,856 | 98.7 |
| 1957 | 28.5 | 84.6 | 2,790 | 96.4 |
| 1958 | 29.8 | 88.4 | 2,846 | 98.4 |
| 1959 | 29.5 | 87.5 | 2,880 | 99.6 |
| 1960 | 30.3 | 89.9 | 2,920 | 100.9 |
| 1961 | 28.9 | 85.8 | 2,890 | 99.9 |
| 1962 | 28.2 | 83.7 | 2,870 | 100.9 |
| 1963 | 29.0 | 86.1 | 2,920 | 105.8 |

¹Dominion Bureau of Statistics, annual reports of Vital Statistics, Ottawa: Queen's Printer, various years.

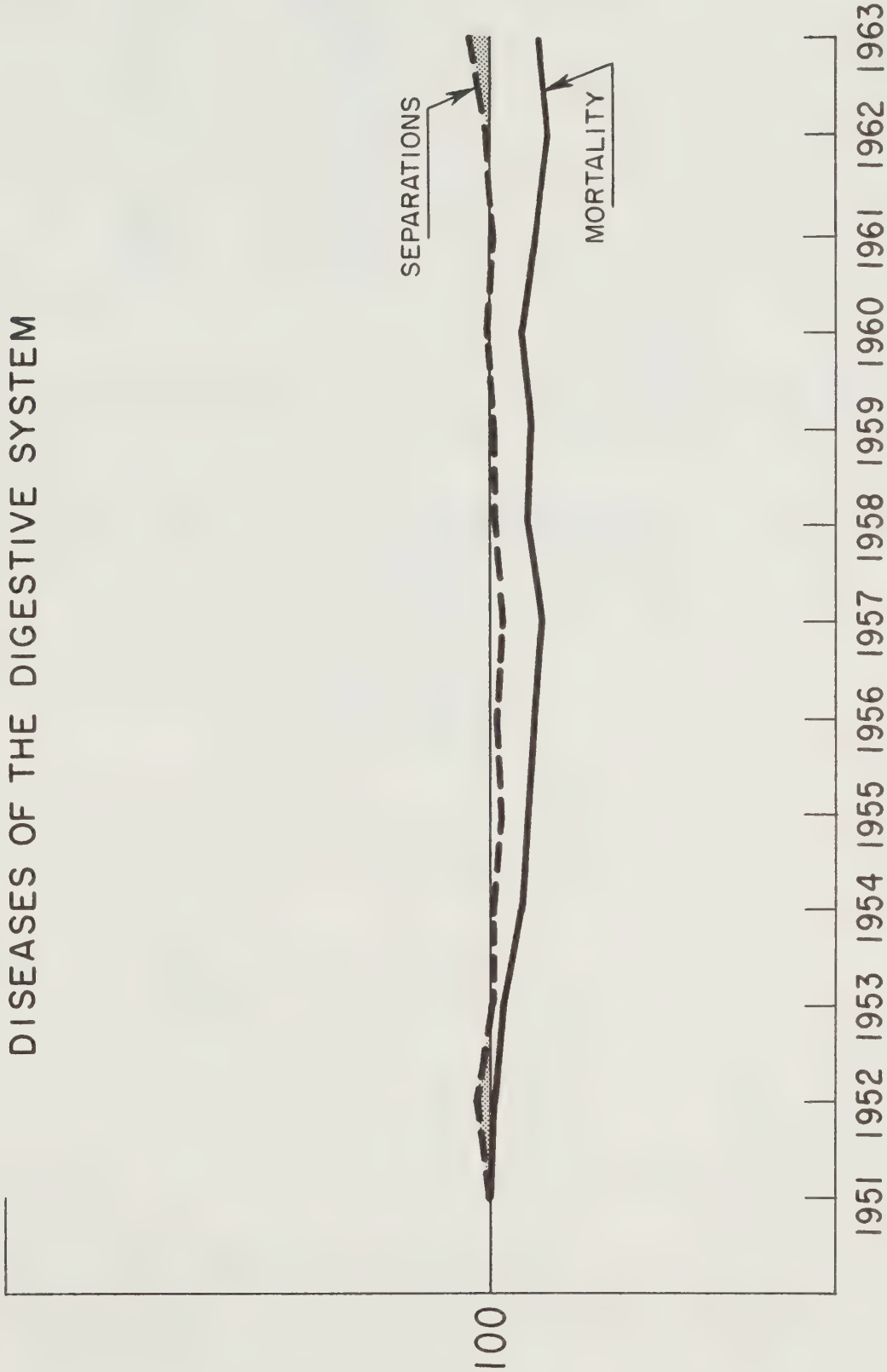
²Department of Public Health, annual reports of Saskatchewan Hospital Services Plan, Regina, Queen's Printer, various years.

Some information is available from the United States National Health Survey on the prevalence of hernia and peptic ulcer but this information is based on household interviews and not on medical examinations. The prevalence estimates for hernia in the United States are as follows:¹

¹Based on United States Public Health Service, "Hernias Reported in Interviews, United States, July 1957-June 1959", Health Statistics from the U.S. National Health Survey, Series B - No. 25, Washington: Department of Health, Education, and Welfare, 1960.

FIGURE — 23

PERCENTAGE CHANGE IN RATES OF MORTALITY AND HOSPITAL SEPARATIONS
1951 — 1963
DISEASES OF THE DIGESTIVE SYSTEM



Source: Table 37.

Prevalence per 100,000 Population of Hernias,
by Age and Sex,
United States, 1957-1959

| Age | Both Sexes | Male | Female |
|----------|------------|--------|--------|
| All ages | 1,490 | 2,320 | 710 |
| 0 -14 | 560 | 820 | 300 |
| 15-24 | 410 | 640 | 210 |
| 25-34 | 940 | 1,240 | 670 |
| 35-44 | 1,210 | 1,770 | 690 |
| 45-54 | 1,900 | 2,810 | 1,020 |
| 55-64 | 3,220 | 5,180 | 1,410 |
| 65-74 | 4,950 | 8,650 | 1,700 |
| 75+ | 6,460 | 12,290 | 1,990 |

The rates are substantially higher for males than for females; for both sexes they increase with age. About 90 per cent of all known cases were reported to have been medically attended and about 80 per cent reported no activity limitation.

Of a similar order is the estimated prevalence of peptic ulcer in the United States, again with substantially higher rates for males than for females, but for both sexes the highest rates are recorded in the middle-age groups:¹

Prevalence per 100,000 Population of Peptic Ulcer,
by Age and Sex,
United States, 1957-1959

| Age | Both Sexes | Male | Female |
|----------|------------|-------|--------|
| All ages | 1,440 | 2,140 | 770 |
| 0-24 | 160 | 250 | — |
| 25-34 | 1,760 | 2,930 | 700 |
| 35-44 | 2,760 | 4,250 | 1,390 |
| 45-54 | 2,870 | 4,050 | 1,750 |
| 55-64 | 2,610 | 3,900 | 1,420 |
| 65-74 | 2,640 | 3,890 | 1,570 |
| 75+ | 1,410 | — | — |

In this general and very cursory review of the health status of the Canadian people many health problems are lost sight of simply because there are only comparatively few cases so that rates would have little meaning, or because not enough

¹ Based on United States Public Health Service, "Peptic Ulcers Reported in Interviews, United States, July 1957-June 1959", Health Statistics from the U.S. National Health Survey, Series B - No. 17, Washington: Department of Health, Education, and Welfare, 1960.

is known about them. A disease to which both these comments apply is cystic fibrosis of the pancreas. Yet, though comparatively few in numbers, cases of cystic fibrosis cause concern because of the complexity and high cost of the treatment required. A pilot survey in New England yielded some information on the disease but the investigators emphasize that the findings cannot be generalized.¹ This survey found an incidence of 1 case per 2,300 live births which is termed low because it excludes cases in newborns who died before leaving hospital and patients not under the supervision of a paediatrician or clinic. Other estimates range from 1 in 600 to 1 in 3,700 live births.² The life expectancy of affected children had increased between the periods 1952-1955 and 1956-1959; in the earlier period 30 per cent of the fatalities were among infants and 7 per cent among children ten years and older, whereas in the second period the respective percentages were 19 and 28 per cent. Cystic fibrosis is given here as an example of the many specific health problems not mentioned as such in this study but submerged under broader headings where their experience is counted as part of the larger group.

Statistical Summary

Mean Age at Death from Diseases of the Digestive System:

During the period from 1951 to 1961, when the mean age at death from all causes had risen from 57.3 to 61.0 (a rise of 6.5 per cent), the corresponding figures for deaths from diseases of the digestive system were:

| | 1951 | 1961 | Per Cent Increase |
|------------|------|------|-------------------|
| Both sexes | 46.4 | 56.6 | 22.0 |
| Male | 46.1 | 56.1 | 21.7 |
| Female | 46.8 | 57.5 | 22.9 |

Incidence and Prevalence of Diseases of the Digestive System According to the Canadian Sickness Survey 1950-51:

| | Persons Developing New Illness During Year per 100,000 Population | Persons Sick Any Day per 100,000 Population |
|---|--|--|
| All Diseases of Digestive System | 14,090 | 13,070 |
| Toothache and dental caries.. | 2,280 | 2,270 |
| Abscesses and other diseases of teeth and supporting structure | 470 | 470 |
| Disorders of occlusion, eruption and tooth development,..... | 1,040 | 1,070 |

¹ Kramm, E.R., "A Cystic Fibrosis Pilot Survey in Three New England States", American Journal of Public Health, December 1962, pp. 2041-2057.

² Ibid., p. 2041.

Incidence and Prevalence of Diseases of the Digestive System According to the Canadian Sickness Survey 1950-51 (Continued):

| | Persons Developing New Illness During Year per 100,000 Population | Persons Sick Any Day per 100,000 Population |
|--|--|--|
| Stomatitis and other diseases of buccal cavity and oesophagus | 490 | 490 |
| Ulcer of stomach and duodenum | 540 | — |
| Disorders of function of stomach and other diseases of stomach and duodenum..... | 7,030 | 6,770 |
| Diseases of appendix, hernia, intestinal obstruction | 1,030 | 880 |
| Gastro-enteritis and colitis, ex- cept ulcerative, age 4 weeks and over | 730 | 720 |
| Functional disorders and other diseases of intestines and peritoneum | 720 | 620 |
| Diseases of liver, gallbladder, and pancreas | 1,320 | 1,000 |

Certain Diseases of the Digestive System in Canada and Selected Other Countries:

A comparison with the mortality rates of other selected countries indicates rates of the same order, except for the higher rate in France, and the varying rates for Mexico and Ceylon. These rates relate to the diseases included in categories B33-37 of the International Classification of Diseases (ulcers, appendicitis, intestinal obstruction and hernia, gastritis, duodenitis, enteritis, colitis, and cirrhosis of liver).

| | Death Rate per 100,000 (1959) |
|-------------------|-------------------------------------|
| Canada | 22.5 |
| United States | 27.6 |
| England and Wales | 26.0 |
| France | 42.3 |
| Sweden | 22.6 |
| Mexico | 234.6 |
| Ceylon | 53.8 |

Diseases of the Digestive System and Their Share of Total Illness and Health Care:

The diseases of the digestive system rank on the whole about midway among the groups covered in this chapter, except for occupying the third rank for physicians' services, and fourth each for hospital services and prescriptions.

Of the deaths due to this group of diseases about one-fifth (1,083 in 1961) are caused by cirrhosis of liver. The corresponding number of deaths in 1951 was 607. Somewhat lower is the number of deaths from intestinal obstruction and hernia (929) and gastro-enteritis and colitis (864). The number of deaths from appendicitis has declined from 262 in 1951 to 187 in 1961.

Appendicitis accounts for 1.9 per cent of all general hospital separations and 1.4 per cent of general hospital days. The rate of hospital separations per 100,000 population is 331, with 2,608 hospital days.

The hospital utilization rate for hernia is similar, 1.8 per cent of all general hospital separations and 1.5 per cent of hospital days. There are 315 separations per 100,000 population, with 2,883 hospital days.

With the exception of dental disorders, the diseases of the digestive system account for the following precentages of total illness and the demand for selected services:

| | Per Cent |
|-----------------------|----------|
| All deaths | 3.7 |
| Premature mortality | 4.3 |
| Disabling illness | 6.8 |
| Non-disabling illness | 8.6 |
| Hospital separations | 10.9 |
| Hospital days | 5.7 |
| Physicians' services | 9.6 |
| Prescriptions | 8.2 |
| Home nursing | 3.8 |

DISEASES OF THE GENITO-URINARY SYSTEM

This group of diseases includes nephritis, diseases of the kidney and bladder, and the various diseases (with the exception of cancer) of the genital organs. Both prevalence and mortality are concentrated in the older age groups.

The death rate has declined since 1951, with a slight upward trend in 1963, which if it continues could be at least partly due to the aging of the population. The hospitalization rate has followed a generally rising trend. Table 38 and Figure 24 show the respective trends from 1951 to 1963.

Statistical Summary

Mean Age at Death from Diseases of the Genito-Urinary System:

During the period from 1951 to 1961, when the mean age at death from all causes had risen from 57.3 to 61.0 (a rise of 6.5 per cent), the corresponding figures for deaths from diseases of the genito-urinary system were:

| | 1951 | 1961 | Per Cent Increase |
|------------|------|------|-------------------|
| Both sexes | 67.8 | 68.5 | 1.0 |
| Male | 69.0 | 69.9 | 1.3 |
| Female | 66.1 | 66.1 | 0.0 |

Incidence and Prevalence of Diseases of the Genito-Urinary System According to the Canadian Sickness Survey 1950-51:

| | Persons Developing New Illness during Year per 100,000 Population | Persons Sick Any Day per 100,000 Population |
|---|---|---|
| All Diseases of the Genito-Urinary System | 2,650 | 750 |
| Diseases of kidney and ureter | 930 | 150 |
| Other diseases of urinary system | 590 | 160 |
| Diseases of genital organs | 1,240 | 450 |

TABLE 38
DISEASES OF THE GENITO-URINARY SYSTEM,
RATES OF MORTALITY AND HOSPITAL SEPARATIONS, AND INDICES,
CANADA, 1951-1963

| Year | Deaths | | Hospital Separations | |
|-----------|--|-----------------------|--|-----------------------|
| | Rate per 100,000 Population ¹ | Per Cent of 1951 Rate | Rate per 100,000 Population ² | Per Cent of 1951 Rate |
| 1951..... | 31.0 | 100.0 | 898 | 100.0 |
| 1952..... | 28.1 | 90.6 | 925 | 103.0 |
| 1953..... | 25.8 | 83.2 | 947 | 105.5 |
| 1954..... | 23.5 | 75.8 | 970 | 108.0 |
| 1955..... | 23.3 | 75.2 | 959 | 106.8 |
| 1956..... | 21.9 | 70.6 | 1,002 | 111.6 |
| 1957..... | 20.0 | 64.5 | 1,064 | 118.5 |
| 1958..... | 18.9 | 61.0 | 1,090 | 121.4 |
| 1959..... | 17.9 | 57.7 | 1,640 ³ | 182.6 |
| 1960..... | 16.7 | 53.9 | 1,700 | 189.3 |
| 1961..... | 16.4 | 52.9 | 1,710 | 190.4 |
| 1962..... | 15.6 | 50.3 | 1,640 | 182.6 |
| 1963..... | 16.0 | 51.6 | 1,730 | 192.7 |

¹Dominion Bureau of Statistics, annual reports of Vital Statistics, Ottawa: Queen's Printer, various years.

²Department of Public Health, annual reports of Saskatchewan Hospital Services Plan, Regina: Queen's Printer, various years.

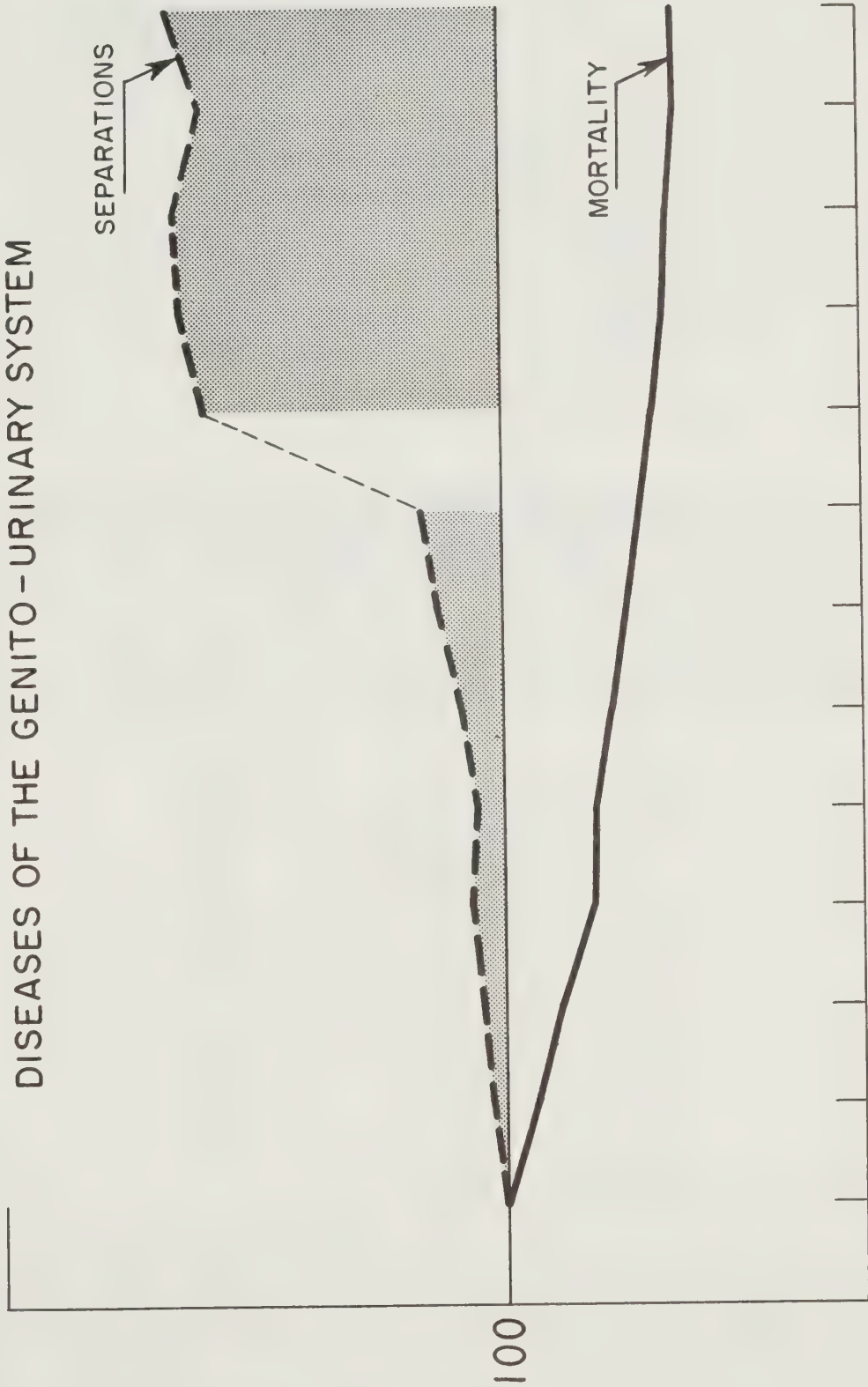
³The sudden rise is due to a change in classification. From 1951 to 1958, the rate covers only categories C41 and C42 of the International Classification of Diseases

FIGURE — 24

PERCENTAGE CHANGE IN RATES OF MORTALITY AND HOSPITAL SEPARATIONS

1951-1963

DISEASES OF THE GENITO-URINARY SYSTEM



BREAK DUE TO CHANGES IN CLASSIFICATION

Source: Table 38.

Certain Diseases of the Genito-Urinary System (nephritis and nephrosis) in Canada and Selected Other Countries:

There is a relatively narrow range of variation in the death rates of the countries selected for comparison:

| | Death Rate per 100,000 Population (1959) |
|-------------------|---|
| Canada | 9.7 |
| United States | 8.0 |
| England and Wales | 8.1 |
| France | 8.6 |
| Sweden | 10.1 |
| Mexico | 10.0 |
| Ceylon | 6.9 |

Diseases of the Genito-Urinary System and Their Share of Total Illness and Health Care:

As a group, these diseases rank about midway in terms of their share of illness and the demand for health services. About one-half of the relatively high demand for physicians' services is due to the diseases of the female genital organs.¹ Nephritis accounts for about one-half of the deaths in this group. The number of these deaths has decreased from 3,043 in 1951 to 1,553 in 1961, with a correspondingly larger decline in the rate. The respective percentages are as follows:

| | Per Cent |
|-----------------------|----------|
| All deaths | 2.1 |
| Premature mortality | 1.5 |
| Disabling illness | 3.5 |
| Non-disabling illness | 5.0 |
| Hospital separations | 7.0 |
| Hospital days | 3.5 |
| Physicians' services | 8.7 |
| Prescriptions | 4.4 |
| Home nursing | 1.8 |

MATERNITY AND COMPLICATIONS

Included under this heading are the conditions which form Class XI of the International Classification of Diseases, i.e., deliveries and complications of pregnancy, childbirth and the puerperium. This group is peculiar in that a large part of the conditions it includes is not the result of an abnormal state of health but nevertheless requires health services. Only complications during the various stages of maternity can be classified as manifestations of ill health. The only

¹ leRiche, H., A Sample Study on the Participants of a Canadian Prepayment Medical Care Plan in Regard to Costs, Disease Episodes and Services, Toronto: Physicians' Services Incorporated, 1957.

other group where health services to apparently healthy people are considered is the supplementary class discussed later in this chapter, which includes well-baby care, periodic health examinations and other preventive procedures.

Deaths from this group of conditions represent the maternal mortality; the rate is customarily expressed in relation to 100,000 live births instead of 100,000 population as are all other cause-specific death rates with the exception of infant and perinatal mortality.

The decline in maternal mortality has been substantial and continuous. This is one of the indicators frequently used as reflecting general health conditions in a country. It is affected not only by the state of personal health services, but also by hygiene and sanitation, as well as living standards and general health habits. The extent of hospitalization, on the other hand, is the result of the birth rate¹ and the proportion of deliveries occurring in hospital.² The changes in mortality and the frequency of hospitalization are shown in Table 39 and Figure 25.

TABLE 39
DELIVERIES AND COMPLICATIONS OF PREGNANCY, CHILDBIRTH AND THE
PUERPERIUM, RATES OF MORTALITY AND HOSPITAL SEPARATIONS, AND
INDICES, CANADA, 1951-1963

| Year | Deaths | | Hospital Separations | |
|-----------|--|--------------------------|---|--------------------------|
| | Rate per 100,000 Live Births ¹ | Per Cent of 1951 Rate | Rate per 100,000 Population ² | Per Cent of 1951 Rate |
| 1951..... | 106.8 | 100.0 | 3,519 | 100.0 |
| 1952..... | 93.2 | 87.3 | 3,627 | 103.1 |
| 1953..... | 78.3 | 73.3 | 3,710 | 105.4 |
| 1954..... | 72.4 | 69.8 | 3,827 | 108.9 |
| 1955..... | 76.1 | 71.3 | 3,736 | 106.2 |
| 1956..... | 61.7 | 57.8 | 3,679 | 104.5 |
| 1957..... | 54.4 | 50.9 | 3,638 | 103.5 |
| 1958..... | 55.9 | 52.3 | 3,557 | 101.1 |
| 1959..... | 54.9 | 51.4 | 3,680 | 104.6 |
| 1960..... | 44.9 | 42.0 | 3,620 | 102.9 |
| 1961..... | 46.0 | 43.1 | 3,530 | 100.3 |
| 1962..... | 40.7 | 38.1 | 3,470 | 98.6 |
| 1963..... | 35.4 | 33.1 | 3,410 | 96.9 |

¹ Dominion Bureau of Statistics, annual reports of Vital Statistics, Ottawa: Queen's Printer, various years.

² Department of Public Health, annual reports of Saskatchewan Hospital Services Plan, Regina: Queen's Printer, various years.

¹ The birth rate stood at 27.2 in 1951, reached a peak of 28.5 in 1954, and then declined gradually to 26.1 in 1961.

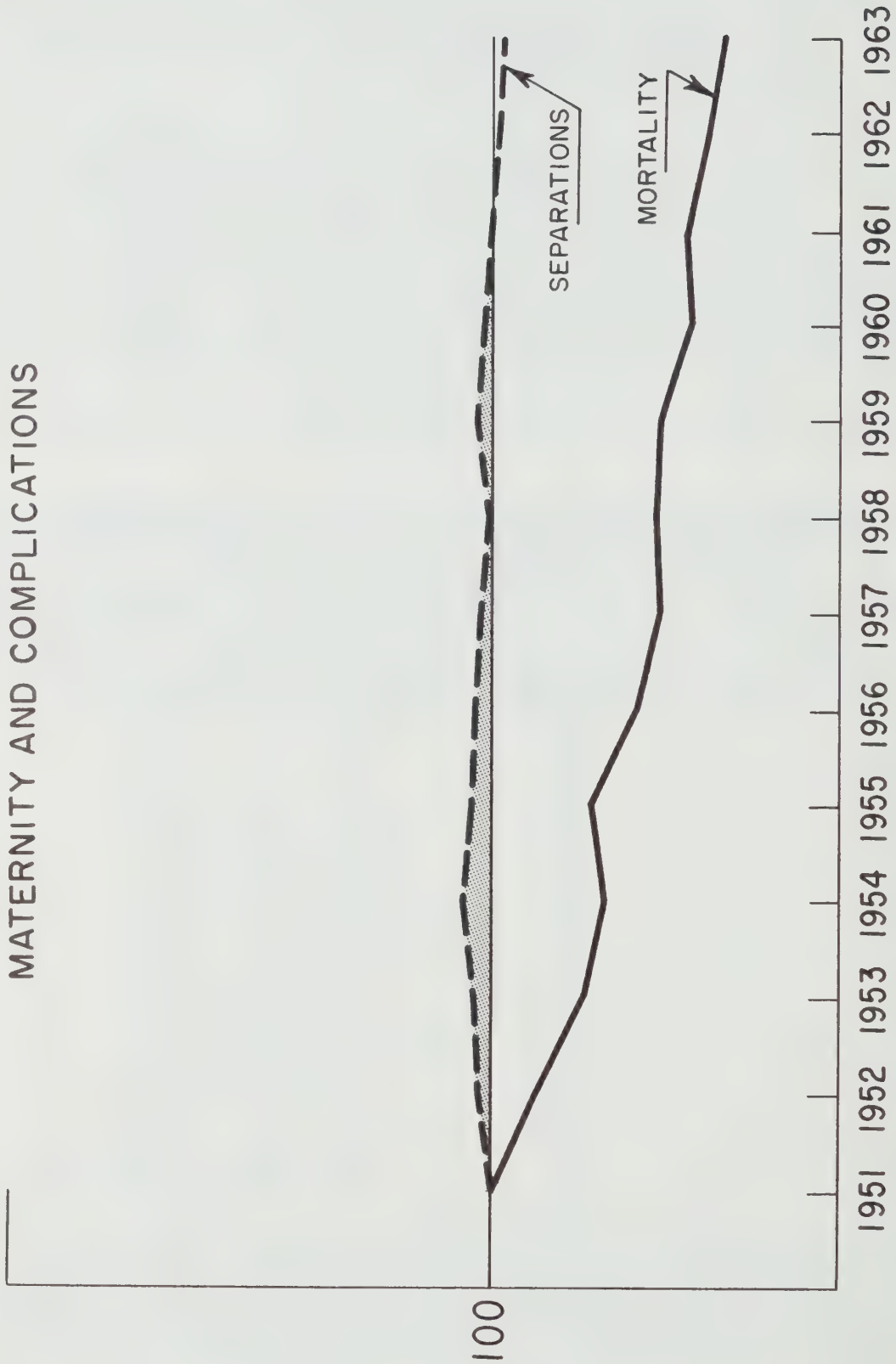
² The percentage of births occurring in hospital rose steadily from 79.1 per cent in 1951 to 96.9 per cent in 1961.

FIGURE — 25

PERCENTAGE CHANGE IN RATES OF MORTALITY AND HOSPITAL SEPARATIONS

1951-1963

MATERNITY AND COMPLICATIONS



Source: Table 39.

The degree to which improved obstetrical care has changed maternal health patterns is illustrated by a comparison between rural and urban areas in the United States:

“In 1915 rural women had a more favorable maternal mortality record than urban-- 55 per 10,000 live births for rural against 64 for urban. By 1955 the positions had long since been reversed; the rates were 5.4 for rural and 4.2 for urban, and excess mortality of over one-fourth for rural women. The excess was even greater - well over one-half -- between the rates of women in non-metropolitan counties (6.0) and those in metropolitan counties.”¹

Statistical Summary

Mean Age at Death from Maternity and its Complications:

During the period from 1951 to 1961, when the mean age at death from all causes had risen from 57.3 to 61.0 (a rise of 6.5 per cent), the corresponding figures for maternal deaths were as follows:

| | 1951 | 1961 | Per Cent Increase |
|--------|------|------|-------------------|
| Female | 31.6 | 32.3 | 2.2 |

Incidence and Prevalence of Maternity and its Complications According to the Canadian Sickness Survey 1950-1951:

The Sickness Survey figures indicate that the majority of the conditions under this heading are related to normal deliveries, so that the terms “illness” and “sick” take on a different meaning in this context.

| | Persons Developing New Illness during Year, per 100,000 Population | Persons Sick Any Day, per 100,000 Population |
|--|---|---|
| All Maternity and Complications | 2,710 | 160 |
| Deliveries without complications | 2,320 | 90 |
| Complications of pregnancy, childbirth and puerperium | 720 | 70 |

Maternity and Its Complications in Canada and Selected Other Countries:

The Canadian maternal mortality rate, though low, is higher than the rates for 1959 in the United States, England and Wales and Sweden indicating that there is room for still further improvement. It is lower than the rate in France and substantially lower than that in Mexico and Ceylon. This reflects the substantial needs of the latter two countries and others with similar standards of living and health, not only in the area of health services as such but also in regard to social conditions generally.

¹ Health Information Foundation, “Advances in Maternal Health”, Progress in Health Services, November 1958, p. 4.

| | Maternal Mortality Rate per 100,000 Live Births (1959) |
|-------------------|--|
| Canada | 54.9 |
| United States | 37.4 |
| England and Wales | 38.7 |
| France | 67.3 |
| Sweden | 23.8 |
| Mexico | 207.0 |
| Ceylon | 338.7 |

Maternity and Its Complications and Their Share of Total Illness and Health Care:

Of the hospital days required by this group, about 70 per cent are due to deliveries without any complication.¹ In 1926 the maternal mortality rate² was 560 per 100,000 live births and declined to 46 by 1961. An indication of the possibility of further improving the Canadian rate is obtained by examining the differences in the rate for those provinces which have not been sharing equally in the remarkable improvement that has taken place over the last quarter of a century.³

| | Maternal Mortality Rate per 100,000 Live Births |
|-----------------------|--|
| Newfoundland | 88 |
| Prince Edward Island | 18 |
| Nova Scotia | 21 |
| New Brunswick | 55 |
| Quebec | 64 |
| Ontario | 38 |
| Manitoba | 48 |
| Saskatchewan | 34 |
| Alberta | 21 |
| British Columbia | 37 |
| Yukon | -- ⁴ |
| Northwest Territories | -- ⁴ |
| Canada | 46 |

This group of conditions ranks low in terms of mortality, only a little higher in the extent of disability, but fairly high in its demand for services, accounting for the following percentages of:

¹ This does not include new-born care which is shown under the "supplementary" group.

² Per 1,000 live births.

³ The mean between the 1960 and 1961 rate is shown to reduce the effect of chance variations due to small numbers, based on Dominion Bureau of Statistics, *Vital Statistics 1961*, Ottawa: Queen's printer, 1963, p. 213.

⁴ Rates for the Yukon and Northwest Territories omitted. Because of the small populations in these Territories maternal deaths are very infrequent so that, for instance, one such death in the Yukon means a jump in the rate of about 180. Comparisons of rates based on such small frequencies would not be meaningful.

| | Per Cent |
|-----------------------|----------|
| All deaths | 0.2 |
| Premature mortality | 0.3 |
| Disabling illness | 2.5 |
| Non-disabling illness | 0.5 |
| Hospital separations | 18.5 |
| Hospital days | 5.7 |
| Physicians' services | 11.3 |
| Prescriptions | 3.5 |
| Home nursing | 9.2 |

DISEASES OF THE SKIN AND CELLULAR TISSUE

Included in this group of diseases are boils, carbuncles, impetigo and other skin conditions such as dermatitis but not cancer.

Table 40 and Figure 26 show no pronounced definite trend in either mortality or hospital separations. The fluctuations in the former may well be due to the small numbers involved.

TABLE 40
DISEASES OF THE SKIN AND CELLULAR TISSUE,
RATES OF MORTALITY AND HOSPITAL SEPARATIONS, AND INDICES,
CANADA, 1951-1963

| Year | Deaths | | Hospital Separations | |
|-----------|--|-----------------------|--|-----------------------|
| | Rate per 100,000 Population ¹ | Per Cent of 1951 Rate | Rate per 100,000 Population ² | Per Cent of 1951 Rate |
| 1951..... | 1.0 | 100.0 | 439 | 100.0 |
| 1952..... | 1.2 | 120.0 | 419 | 95.4 |
| 1953..... | 1.1 | 110.0 | 420 | 95.7 |
| 1954..... | 1.3 | 130.0 | 467 | 106.4 |
| 1955..... | 1.4 | 140.0 | 472 | 107.5 |
| 1956..... | 1.3 | 130.0 | 514 | 117.1 |
| 1957..... | 1.5 | 150.0 | 499 | 113.7 |
| 1958..... | 1.2 | 120.0 | 486 | 110.7 |
| 1959..... | 1.2 | 120.0 | 480 | 109.3 |
| 1960..... | 0.9 | 90.0 | 460 | 104.8 |
| 1961..... | 0.8 | 80.0 | 430 | 97.9 |
| 1962..... | 1.0 | 100.0 | 410 | 93.4 |
| 1963..... | 0.9 | 90.0 | 420 | 95.7 |

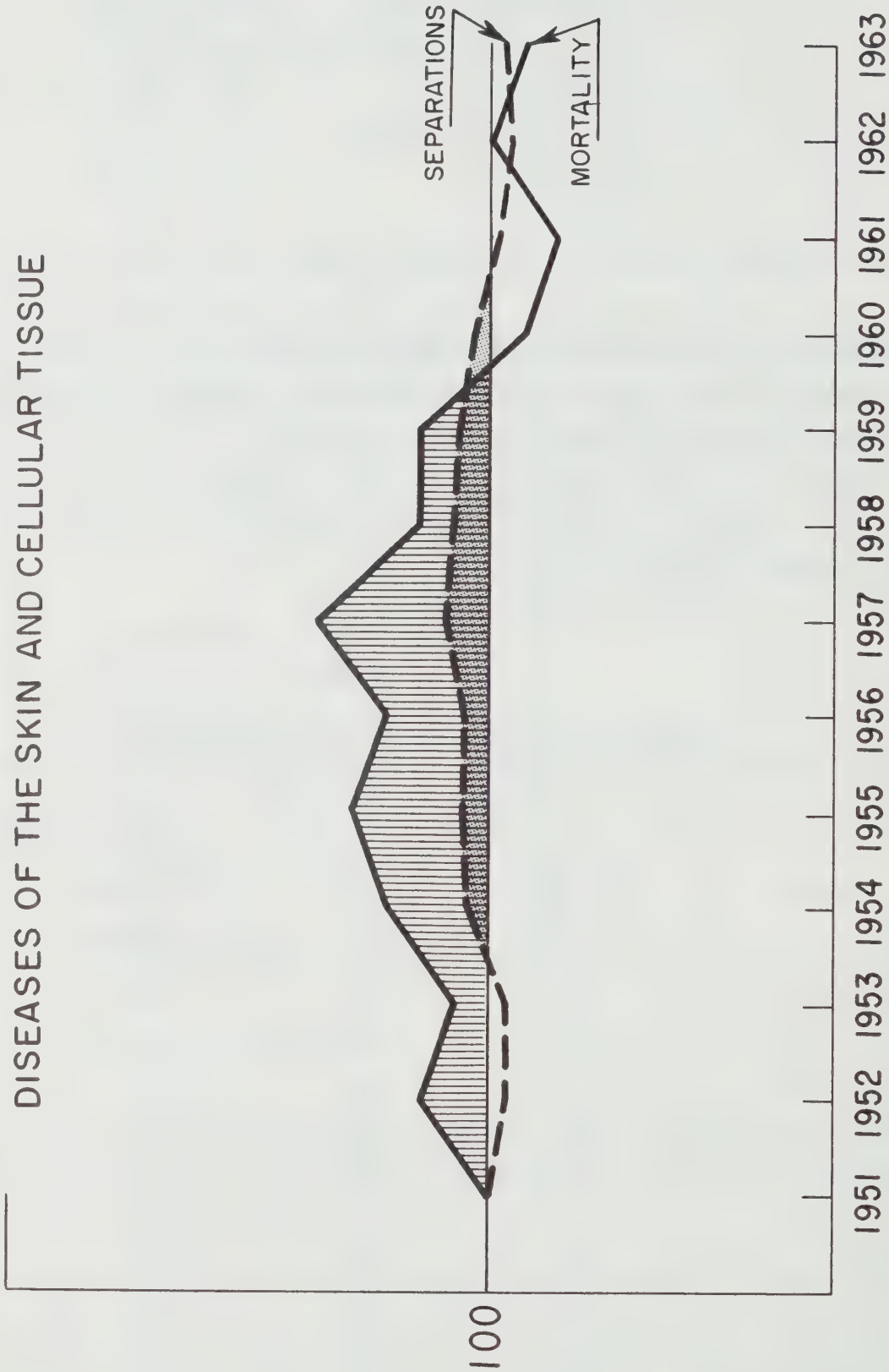
¹Information supplied by the Dominion Bureau of Statistics.
²Department of Public Health, annual reports of Saskatchewan Hospital Services Plan. Regina: Queen's Printer, various years.

FIGURE —26.

PERCENTAGE CHANGE IN RATES OF MORTALITY AND HOSPITAL SEPARATIONS

1951 — 1963

DISEASES OF THE SKIN AND CELLULAR TISSUE



Source: Table 40.

Statistical Summary

Mean Age at Death from Diseases of the Skin and Musculoskeletal System:

Data on the mean age at death are available only for the combined groups of skin diseases and the diseases of the musculoskeletal system.

During the period from 1951 to 1961, when the mean age at death from all causes had risen from 57.3 to 61.0 (a rise of 6.5 per cent) the corresponding figures for these groups were:

| | 1951 | 1961 | Per Cent |
|------------|------|------|----------|
| Both sexes | 58.6 | 61.0 | 4.1 |
| Male | 56.4 | 58.0 | 2.8 |
| Female | 60.7 | 63.6 | 4.8 |

Incidence and Prevalence of Diseases of the Skin and Cellular Tissue According to the Canadian Sickness Survey 1950-1951:

| | Persons Developing New Illness during Year, per 100,000 Population | Persons Sick Any Day, per 100,000 Population |
|---|---|---|
| <u>All Diseases of Skin and Cellular Tissue</u> | 4,000 | 770 |
| Boil and carbuncle | 1,200 | 80 |
| Cellulitis and impetigo | 670 | 50 |
| Other local skin infections | 1,000 | 100 |
| Eczema | 380 | 280 |
| Other diseases of skin | 900 | 270 |

Diseases of the Skin and Cellular Tissue in Canada and Selected Other Countries:

No data are available for international comparisons of mortality.

Diseases of the Skin and Cellular Tissue and Their Share of Total Illness and Health Care:

As a group, these diseases rank generally low in their share of illness, especially disabling illness, and the demand for health care, with the exception of physicians' services and to a lesser extent prescriptions. The demand for physicians' services is due largely to the diseases described as infections of skin and subcutaneous tissue, which also account for about half of the prescriptions required by this group.

The diseases in this group account for the following percentages of:

| | Per Cent |
|-----------------------|----------|
| All deaths | 0.1 |
| Premature mortality | 0.1 |
| Disabling illness | 1.6 |
| Non-disabling illness | 5.5 |
| Hospital separations | 2.0 |
| Hospital days | 0.9 |
| Physicians' services | 8.3 |
| Prescriptions | 4.2 |
| Home nursing | 1.6 |

DISEASES OF THE BONES AND ORGANS OF MOVEMENT

These are mainly the various forms of arthritis and rheumatism, ankylosis and other disorders of the musculoskeletal system except cancer. Neither mortality nor hospital separations display any pronounced changes in their trend as shown in Table 41 and Figure 27.

TABLE 41
DISEASES OF THE BONES AND ORGANS OF MOVEMENT,
RATES OF MORTALITY AND HOSPITAL SEPARATIONS, AND INDICES,
CANADA, 1951-1963

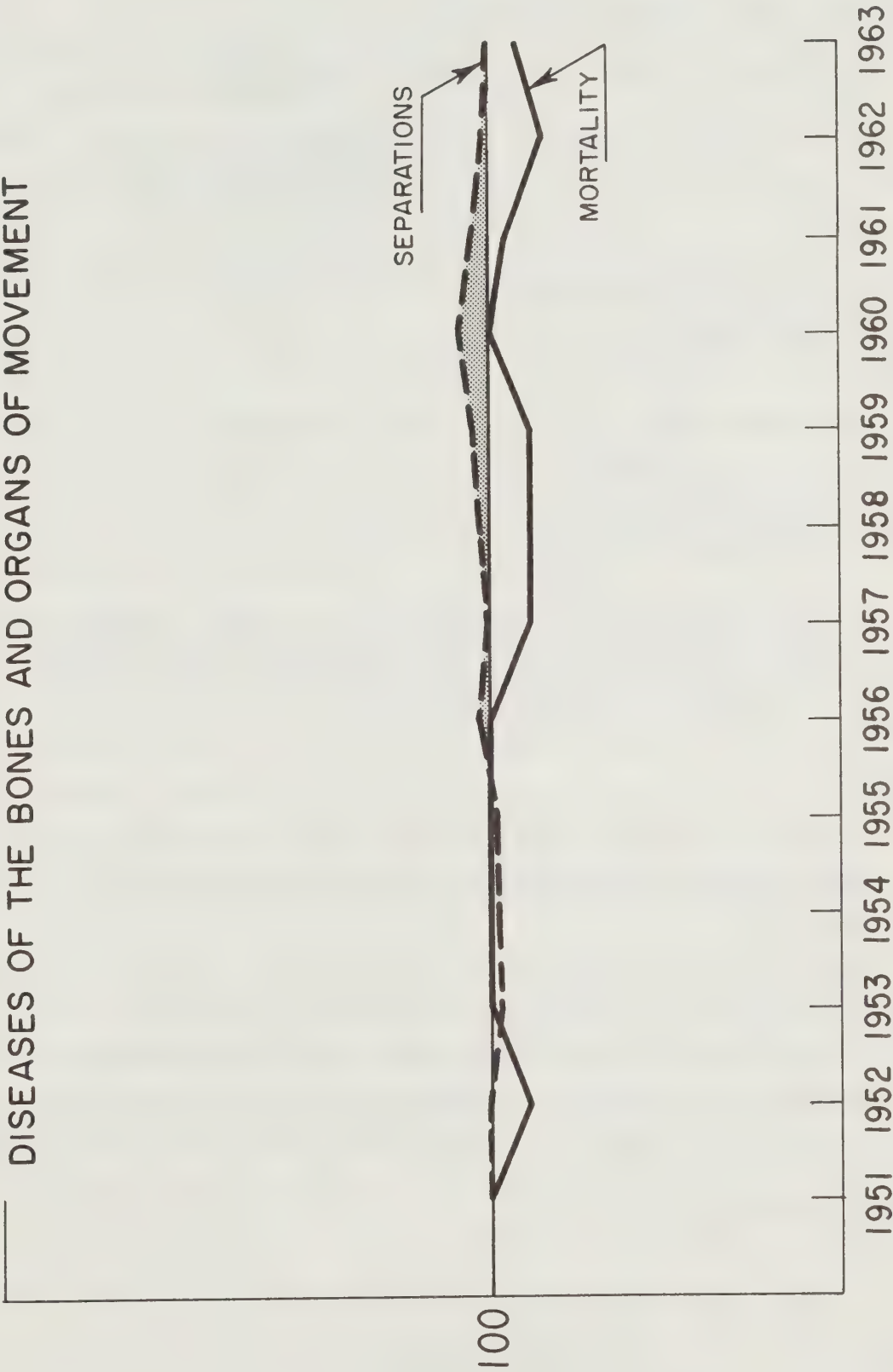
| Year | Deaths | | Hospital Separations | |
|-----------|--|-----------------------|--|-----------------------|
| | Rate per 100,000 Population ¹ | Per Cent of 1951 Rate | Rate per 100,000 Population ² | Per Cent of 1951 Rate |
| 1951..... | 2.5 | 100.0 | 710 | 100.0 |
| 1952..... | 2.2 | 88.0 | 711 | 100.1 |
| 1953..... | 2.5 | 100.0 | 693 | 97.6 |
| 1954..... | 2.5 | 100.0 | 696 | 98.0 |
| 1955..... | 2.5 | 100.0 | 697 | 98.2 |
| 1956..... | 2.5 | 100.0 | 730 | 102.8 |
| 1957..... | 2.2 | 88.0 | 711 | 100.1 |
| 1958..... | 2.2 | 88.0 | 726 | 102.3 |
| 1959..... | 2.2 | 88.0 | 740 | 104.2 |
| 1960..... | 2.5 | 100.0 | 770 | 108.5 |
| 1961..... | 2.4 | 96.0 | 750 | 105.6 |
| 1962..... | 2.1 | 84.0 | 720 | 101.4 |
| 1963..... | 2.3 | 92.0 | 710 | 100.0 |

¹ Information supplied by the Dominion Bureau of Statistics.

² Department of Public Health, annual reports of Saskatchewan Hospital Services Plan, Regina: Queen's Printer, various years.

FIGURE — 27

PERCENTAGE CHANGE IN RATES OF MORTALITY AND HOSPITAL SEPARATIONS
1951 — 1963
DISEASES OF THE BONES AND ORGANS OF MOVEMENT



Source: Table 41.

Statistical Summary

Mean Age at Death from Diseases of the Bones and Organs of Movement:

The relevant data are combined with the foregoing group of diseases of the skin and cellular tissue, and are shown there.

Incidence and Prevalence of the Diseases of the Bones and Organs of Movement According to the Canadian Sickness Survey 1950-1951:

| | Persons Developing New Illness during Year, per 100,000 Population | Persons Sick Any Day, per 100,000 Population |
|---|---|---|
| <u>All Diseases of the Bones and Organs of Movement</u> | 2,330 | 1,490 |
| Arthritis | — | 520 |
| Muscular rheumatism | 1,070 | 110 |
| Rheumatism unspecified | 720 | 570 |
| Other diseases of bones, joints and musculoskeletal system | 420 | 290 |

It is interesting to note that a recent survey under the auspices of the Canadian Arthritis and Rheumatism Society found an unusual prevalence of spinal arthritis among the Haida Indians in the Queen Charlotte Islands.¹

Diseases of the Bones and Organs of Movement in Canada and Selected Other Countries:

No data are available for international comparisons of mortality.

Diseases of the Bones and Organs of Movement and Their Share of Total Illness and Health Care:

About 80 per cent of the non-disabling and 90 per cent of the disabling illness in this group is due to arthritis and rheumatism, and similar proportions apply to the demand for physicians' services, prescriptions and home nursing services.

The impact of this group of diseases lies mainly in their share of non-disabling illness, to a lesser extent of disabling illness, and also in their demand for physicians' services, prescriptions and home nursing services. They account for the following percentages of:

| | Per Cent |
|-----------------------|----------|
| All deaths | 0.3 |
| Premature mortality | 0.3 |
| Disabling illness | 5.7 |
| Non-disabling illness | 10.0 |

¹ Robinson, H.S., paper presented at the Annual Meeting of the American Rheumatism Association, Atlantic City, June 13, 1963.

| | |
|----------------------|-----|
| Hospital separations | 2.7 |
| Hospital days | 2.9 |
| Physicians' services | 7.2 |
| Prescriptions | 4.6 |
| Home nursing | 5.5 |

CONGENITAL MALFORMATIONS

Comprised by this group are congenital malformations of a physical nature. Thus, to appreciate fully the impact of these conditions one would have to add the considerable amount of such other conditions as mental retardation. All these congenital defects form part of the larger problem of impairments generally and will be further discussed in that connection.

In comparison with other diseases and injuries the conditions falling under this heading are not numerous either as causes of death or hospitalization. Their impact, however, lies in the often high degree of disability affecting the individual for a lifetime, making great demands - psychological and material - on his family, and frequently requiring extensive services over prolonged periods of time. These facts tend to be overlooked if health problems are measured largely in terms of numbers of cases and the total volume of care they require.

Table 42 and Figure 28 indicate a slow but fairly steady decline in mortality from congenital malformations, accompanied by a sharp rise in the incidence of hospitalization around the late 1950's, and more recently a levelling off in the rate of hospital separations.

As observed at the other extreme of the life span, reduced perinatal and infant mortality and the postponement of death, save life but not always healthy life. It is fortunate that modern treatment methods and appliances make it increasingly possible to compensate at least to some extent for congenital disability. Whether the increased hospitalization rate reflects only a greater proportion of congenital malformations being brought to treatment or whether it also indicates an increasing incidence of these conditions, can be established only when more complete statistics become available from the information contained on birth certificates and from registries such as the one in British Columbia. These devices facilitate studies into the effects of exposure to radiation, drugs and other environmental factors.

In Ontario, congenital abnormalities were reported in 1,110 per 100,000 live births, and 16,000 still births in 1961. Among the live-born infants with congenital abnormalities the percentage of premature births was about double the approximately seven per cent found among all live births.¹ Statistics like these, based on the routine reporting by physicians on the birth certificate, are subject to certain limitations regarding the completeness of the reporting and also the

¹ Ontario Department of Health, *Congenital Abnormalities Reported by Physicians — Infants born alive and stillbirths, Ontario, 1961*. Division of Medical Statistics, Special Report No. 18, Toronto: The Department, October 1962, pp. 1 and 2.

interpretation of what constitutes a congenital malformation or abnormality.¹ This, as well as the difficulty of diagnosing abnormalities shortly after birth when the birth certificate is completed, is also observed by le Vann in discussing an apparent increase in the rate of congenital malformations for 790 per 100,000 live births in 1959 to 1,380 in 1961.²

TABLE 42
CONGENITAL MALFORMATIONS,
RATES OF MORTALITY AND HOSPITAL SEPARATIONS, AND INDICES,
CANADA, 1951-1963

| Year | Deaths | | Hospital Separations | |
|-----------|--|-----------------------|--|-----------------------|
| | Rate per 100,000 Population ¹ | Per Cent of 1951 Rate | Rate per 100,000 Population ² | Per Cent of 1951 Rate |
| 1951..... | 17.4 | 100.0 | 79 | 100.0 |
| 1952..... | 18.1 | 104.0 | 75 | 94.9 |
| 1953..... | 17.4 | 100.0 | 79 | 100.0 |
| 1954..... | 16.9 | 97.1 | 90 | 113.9 |
| 1955..... | 16.7 | 96.0 | 86 | 108.9 |
| 1956..... | 17.6 | 101.1 | 99 | 125.3 |
| 1957..... | 16.7 | 96.0 | 103 | 130.4 |
| 1958..... | 16.6 | 95.4 | 128 | 162.0 |
| 1959..... | 15.8 | 90.8 | 140 | 177.2 |
| 1960..... | 15.1 | 86.8 | 140 | 177.2 |
| 1961..... | 15.5 | 89.1 | 140 | 177.2 |
| 1962..... | 15.6 | 89.7 | 130 | 164.6 |
| 1963..... | 14.3 | 82.2 | 140 | 177.2 |

¹Dominion Bureau of Statistics, annual reports of Vital Statistics, Ottawa: Queen's Printer, various years.

²Based on Department of Public Health, annual reports of Saskatchewan Hospital Services Plan, Regina: Queen's Printer, various years. (From 1951 to 1958 estimated as one-half of the separations shown under category C48 of the International Classification of Diseases).

Statistical Summary

Mean Age at Death from Congenital Malformations:

During the period from 1951 to 1961, when the mean age at death from all causes had risen from 57.3 to 61.0 (a rise of 6.5 per cent), the corresponding figures for deaths from congenital malformations were:

| | 1951 | 1961 | Per Cent Increase |
|------------|------|------|-------------------|
| Both sexes | 3.5 | 4.9 | 40.0 |
| Male | 3.9 | 4.7 | 20.5 |
| Female | 3.0 | 5.2 | 73.3 |

¹ *Ibid.*, p. 2, and also Doughty, J.H., "Case Finding of Congenital Malformations", *Registry for Handicapped Children and Adults, Annual Report 1962*, Department of Health Services and Hospital Insurance, British Columbia, pp. 37-50.

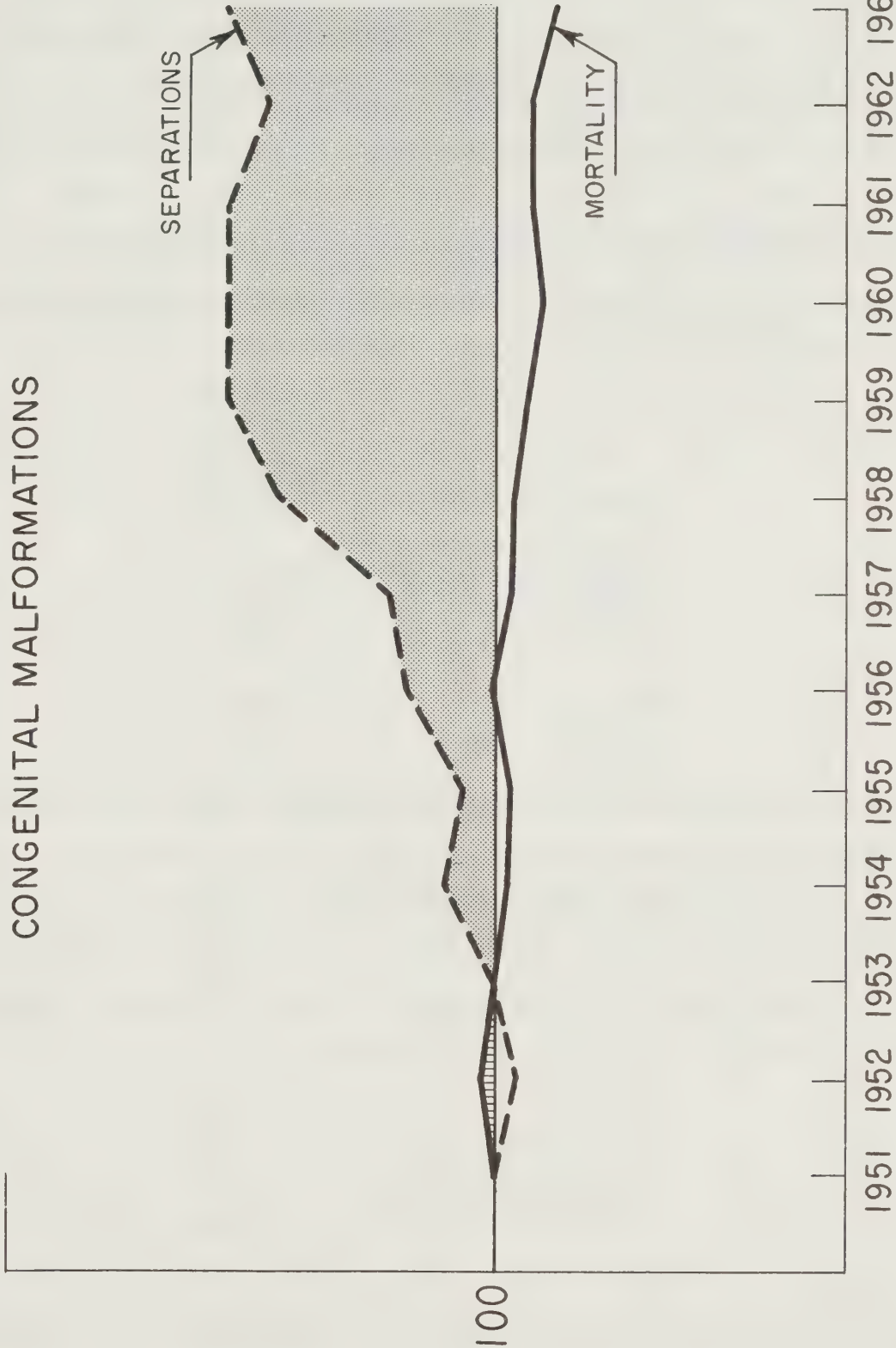
² le Vann, L.J., "Congenital Abnormalities in Children Born in Alberta during 1961", *Canadian Medical Association Journal*, July 20, 1963, p. 120.

FIGURE — 28

PERCENTAGE CHANGE IN RATES OF MORTALITY AND HOSPITAL SEPARATIONS

1951 — 1963

CONGENITAL MALFORMATIONS



Source: Table 42

Incidence and Prevalence of Congenital Malformations:

There are no data available from the Canadian Sickness Survey. A study in New York State, carried out from 1948 to 1955, showed an average annual incidence of 1,320 congenital malformations per 100,000 live births.¹ In British Columbia the incidence of mongolism was found to be 146 per 100,000 live births, and that of congenital heart disease of 425 per 100,000 live births.² The same study associates a greater incidence of these defects with a higher age of the mother,³ while others found an increased risk of child handicap or death among children of fathers aged 45 and over, even after possible effects from maternal age have been removed.⁴

Congenital Malformations in Canada and Selected Other Countries:

The comparison is based on the number of deaths due to congenital malformations per 100,000 live births.

| | Death Rate per 100,000 Live Births |
|-------------------|--|
| Canada | 448.4 |
| United States | 367.0 |
| England and Wales | 454.0 |
| France | 360.5 |
| Sweden | 347.2 |
| Mexico | 188.5 |
| Ceylon | 17.4 |

Congenital Malformations and Their Share of Total Illness and Health Care:

Because of the deaths occurring generally at an early age, the impact of these conditions lies particularly in their share in life years lost due to premature mortality. Further successes in keeping children with malformations alive and wider application of rehabilitation services and prosthetic devices may well continue to demand a growing share of health services. At present, congenital malformations account for the following percentages of:

| | Per Cent |
|---------------------|----------|
| All deaths | 2.0 |
| Premature mortality | 6.5 |
| Duration of illness | n.a. |

¹ Gentry, J.T., "An Epidemiological Study of Congenital Malformations in New York State", *American Journal of Public Health*, April 1959, p. 498.

² Renwick, D.H.G., "Estimates of Incidence and Prevalence of Mongolism and of Congenital Heart Disease in British Columbia", *Canadian Medical Association Journal*, August 22, 1964, pp. 365-371.

³ *Ibid.*

⁴ Newcombe, H.B., Tavendale, O.G., "Effects of Father's Age on the Risk of Child Handicap or Death", *American Journal of Human Genetics*, March 1965, p. 177.

| | |
|----------------------|-----|
| Hospital separations | 0.8 |
| Hospital days | 0.7 |
| Physicians' services | 0.3 |
| Prescriptions | nil |
| Home nursing | 0.2 |

CERTAIN DISEASES OF EARLY INFANCY

This group of diseases comprises only some of the causes responsible for Canada's relatively high infant mortality rate. They are confined to the neonatal period, i.e., the first four weeks after birth, and include, among other causes, birth injuries, asphyxia, infections, and haemolytic disease of the newborn. In 1963, these certain diseases of early infancy accounted for 7,040 (or 84 per cent) of the 8,411 neonatal deaths in Canada. Another 1,282 deaths in this age group were due to the aforescussed congenital malformations.¹ The most frequent of the causes of death in this group are asphyxia, birth injury and immaturity.

Table 43 and Figure 29 show a slow but almost steady decline in the mortality from these diseases, accompanied by a sharp rise in the incidence of hospitalization, indicating a growing susceptibility to successful treatment similar to the pattern observed in regard to the congenital malformations.

TABLE 43
CERTAIN DISEASES OF EARLY INFANCY,
RATES OF MORTALITY AND HOSPITAL SEPARATIONS, AND INDICES,
CANADA, 1951-1963

| Year | Deaths | | Hospital Separations | |
|-----------|--|-----------------------|--|-----------------------|
| | Rate per 100,000 Population ¹ | Per Cent of 1951 Rate | Rate per 100,000 Population ² | Per Cent of 1951 Rate |
| 1951..... | 51.8 | 100.0 | 79 | 100.0 |
| 1952..... | 53.6 | 103.5 | 75 | 94.9 |
| 1953..... | 50.5 | 97.5 | 79 | 100.0 |
| 1954..... | 46.7 | 90.2 | 90 | 113.9 |
| 1955..... | 45.4 | 87.6 | 86 | 108.9 |
| 1956..... | 47.0 | 90.7 | 99 | 125.3 |
| 1957..... | 48.0 | 92.7 | 103 | 130.4 |
| 1958..... | 44.3 | 85.5 | 128 | 162.0 |
| 1959..... | 42.6 | 82.2 | 140 | 177.2 |
| 1960..... | 39.8 | 76.8 | 170 | 215.2 |
| 1961..... | 39.3 | 75.9 | 180 | 227.8 |
| 1962..... | 39.4 | 76.1 | 130 | 164.6 |
| 1963..... | 37.3 | 72.0 | 90 | 113.9 |

¹ Dominion Bureau of Statistics, annual reports of Vital Statistics, Ottawa: Queen's Printer, various years.

² Department of Public Health, annual reports of Saskatchewan Hospital Services Plan, Regina: Queen's Printer, various years. (From 1951 to 1958, estimated as one-half of the separations shown under category C48 of the International Classification of Diseases).

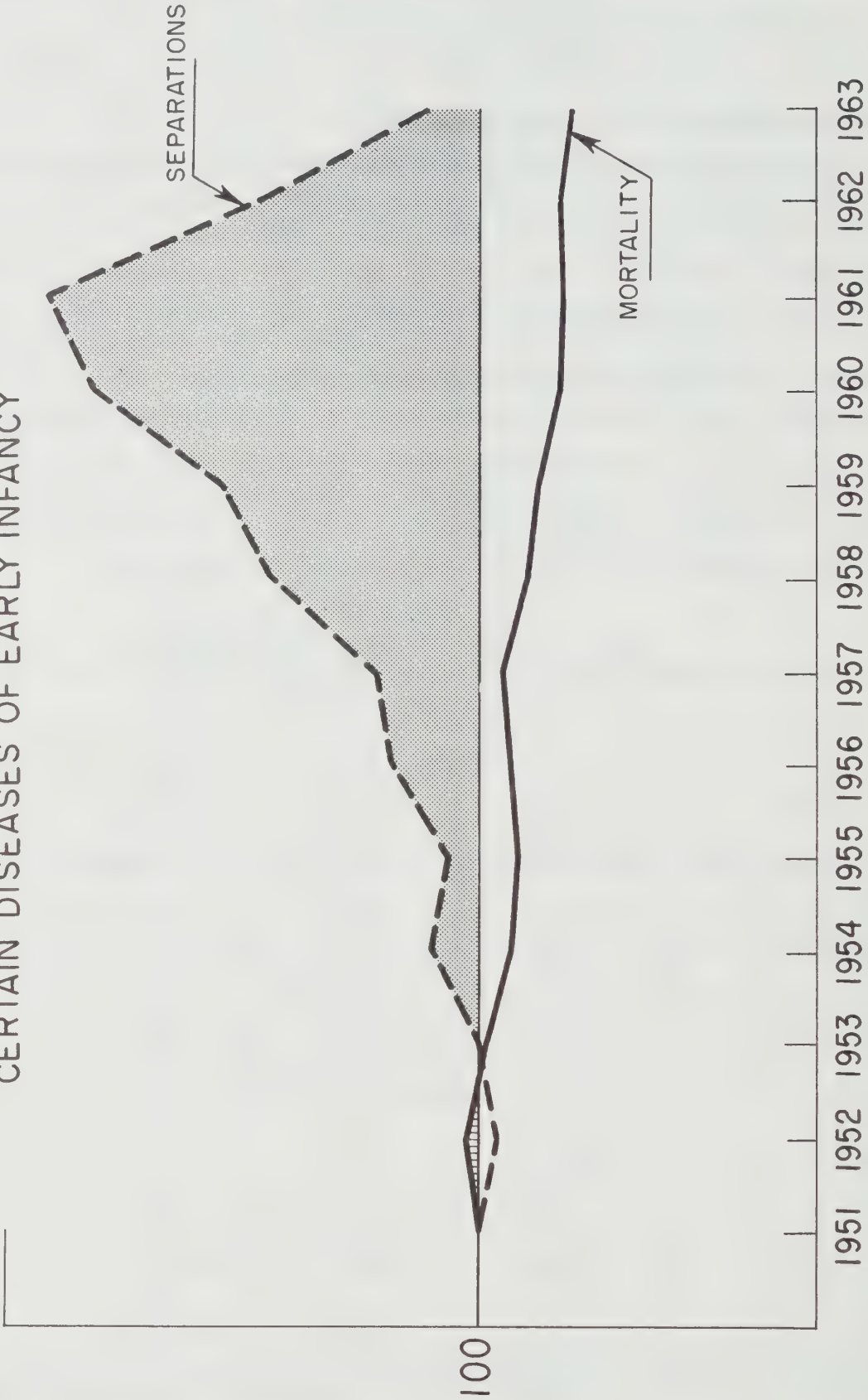
¹ Dominion Bureau of Statistics, *Vital Statistics 1963*, Ottawa: Queen's Printer 1965, pp. 138 and 180.

FIGURE — 29

PERCENTAGE CHANGE IN RATES OF MORTALITY AND HOSPITAL SEPARATIONS

1951-1963

CERTAIN DISEASES OF EARLY INFANCY



Source: Table 43.

Most of the causes of neonatal mortality have shown declining rates but some still remain stubbornly high, especially where immaturity is the cause or a complicating factor. Immaturity as such was stated as the cause of newborn deaths in 27 per cent of these deaths in 1963, and it was present as a complicating factor in another 35 per cent.

Post-natal asphyxia and antelectasis, especially when combined with immaturity, and birth injuries rank prominently as causes of death in early infancy. Birth injuries, pneumonia, and haemolytic diseases also account for several hundred of these deaths each year, as do other infections. A notable reduction has taken place in the newborn deaths arising from certain diseases of the mother, particularly toxæmia, during pregnancy.

To achieve a further reduction in the infant mortality rate, "care in the newborn is the first hurdle that must be passed", to be accomplished "by better understanding and closer working relationships between workers in the fields of preventive and therapeutic medicine".¹ In regard to obstetrical care in general it has been said:

"The profession must now come to grips with the problem of fetal morbidity, not only in its most obvious forms which are recognizable at birth, but also in its more subtle forms which are not manifested until years afterwards. Antenatal care and delivery must be viewed with critical awareness. No facet of care should be minimized by physician or nurse, or because of lack of hospital facilities. Intelligent application of current knowledge along with future discoveries cannot help but lower the incidence of fetal morbidity."²

The health of the newborn is to a large extent a function of the care given to mother and baby, their nutrition, and standards of hygiene prevailing in their environment. That there is room for improvement in these respects is clearly indicated by the differences among the neonatal mortality rates in the various provinces; these rates, in 1963, ranged from a low of 1,255 per 100,000 live births in Prince Edward Island to a high of 4,565 in the Northwest Territories -- or from rates approaching those of European countries with good health conditions to those found in countries with the worst.

Statistical Summary

Mean Age at Death from Certain Diseases of Early Infancy:

This is not available but as it could be measured only in days, it would at best indicate the extent of survival within the newborn period.

Incidence and Prevalence of Certain Diseases of Early Infancy According to the Canadian Sickness Survey 1950-51:

¹ Webb, Jean F., "Observations on Maternal and Infant Health in Canada", *Canadian Journal of Public Health*, January 1954, pp. 5 and 6.

² Brody, H., "Obstetrics: The Present Challenge", *Canadian Medical Association Journal*, August 29, 1964, p. 443.

These data likewise are not available but the extent to which incidence and prevalence vary from mortality may be seen from the different trends for mortality and hospitalization.

Certain Diseases of Early Infancy in Canada and Selected Other Countries:

The mortality rate from these diseases (1,554.9 per 100,000 live births in 1959) was at about the same level as that in the United States, higher than that in England and Wales, France, and Sweden, and substantially lower than that in Mexico and Ceylon:

| | Death Rate per 100,000 Live Births (1959) |
|-------------------|--|
| Canada | 1,554.9 |
| United States | 1,599.9 |
| England and Wales | 1,244.0 |
| France | 1,307.2 |
| Sweden | 1,070.1 |
| Mexico | 2,935.3 |
| Ceylon | 3,163.6 |

Certain Diseases of Early Infancy and Their Share of Total Illness and Health Care:

These diseases are among the major causes of death also in Canada. Because almost the entire expected life span is lost in each case, this group of diseases ranks second in terms of premature mortality. It accounted for the following percentages of:

| | Per Cent |
|----------------------|----------|
| All deaths | 5.1 |
| Premature mortality | 17.4 |
| Duration of illness | n.a. |
| Hospital separations | 0.4 |
| Hospital days | 0.3 |
| Physicians' services | 1.3 |
| Prescriptions | 0.2 |
| Home nursing | 0.1 |

SYMPTOMS, SENILITY, AND ILL-DEFINED CONDITIONS

This group of conditions is largely residual; it includes any diagnoses that do not belong in one of the other groups or where the diagnosis is not sufficiently specific to permit of its classification under any of the foregoing headings, with the exception of the injuries dealt with in the following section. To the extent that inclusion under ill-defined conditions is due to inadequate information in the

basic record, the comparison of data over a period of time or between different countries will reflect to a considerable degree changes in the quality of “book-keeping” rather than actual health conditions. Thus, the decline shown in mortality in Table 44 and Figure 30 probably reflects largely an improvement in the medical certification of the cause of death on the death certificate. Due to changes in the classification, comparable hospital data are not available prior to 1959.

TABLE 44
SYMPTOMS, SENILITY, AND ILL-DEFINED CONDITIONS,
RATES OF MORTALITY AND HOSPITAL SEPARATIONS, AND INDICES,
CANADA, 1951–1963

| Year | Deaths | | Hospital Separations | |
|-----------|--|-----------------------|--|-----------------------|
| | Rate per 100,000 Population ¹ | Per Cent of 1951 Rate | Rate per 100,000 Population ² | Per Cent of 1959 Rate |
| 1951..... | 16.5 | 100.0 | — | — |
| 1952..... | 15.4 | 93.3 | — | — |
| 1953..... | 13.2 | 80.0 | — | — |
| 1954..... | 12.6 | 76.4 | — | — |
| 1955..... | 12.1 | 73.3 | — | — |
| 1956..... | 11.3 | 68.5 | — | — |
| 1957..... | 10.2 | 61.8 | — | — |
| 1958..... | 8.9 | 53.9 | — | — |
| 1959..... | 8.8 | 53.3 | 520 | 100.0 |
| 1960..... | 7.6 | 46.1 | 500 | 96.2 |
| 1961..... | 6.7 | 40.6 | 470 | 90.4 |
| 1962..... | 6.9 | 41.8 | 550 | 105.8 |
| 1963..... | 6.5 | 39.4 | 610 | 117.3 |

¹ Dominion Bureau of Statistics, annual reports of Vital Statistics, Ottawa: Queen’s Printer, various years.
² Department of Public Health, annual reports of Saskatchewan Hospital Services Plan, Regina: Queen’s Printer, various years. (Not available prior to 1959.)

Statistical Summary

Mean Age at Death from Symptoms, Senility and Ill-defined Conditions:

During the period from 1951 to 1961, when the mean age at death from all causes had risen from 57.3 to 61.0 (a rise of 6.5 per cent), the corresponding figures for deaths from symptoms, senility and ill-defined conditions were:

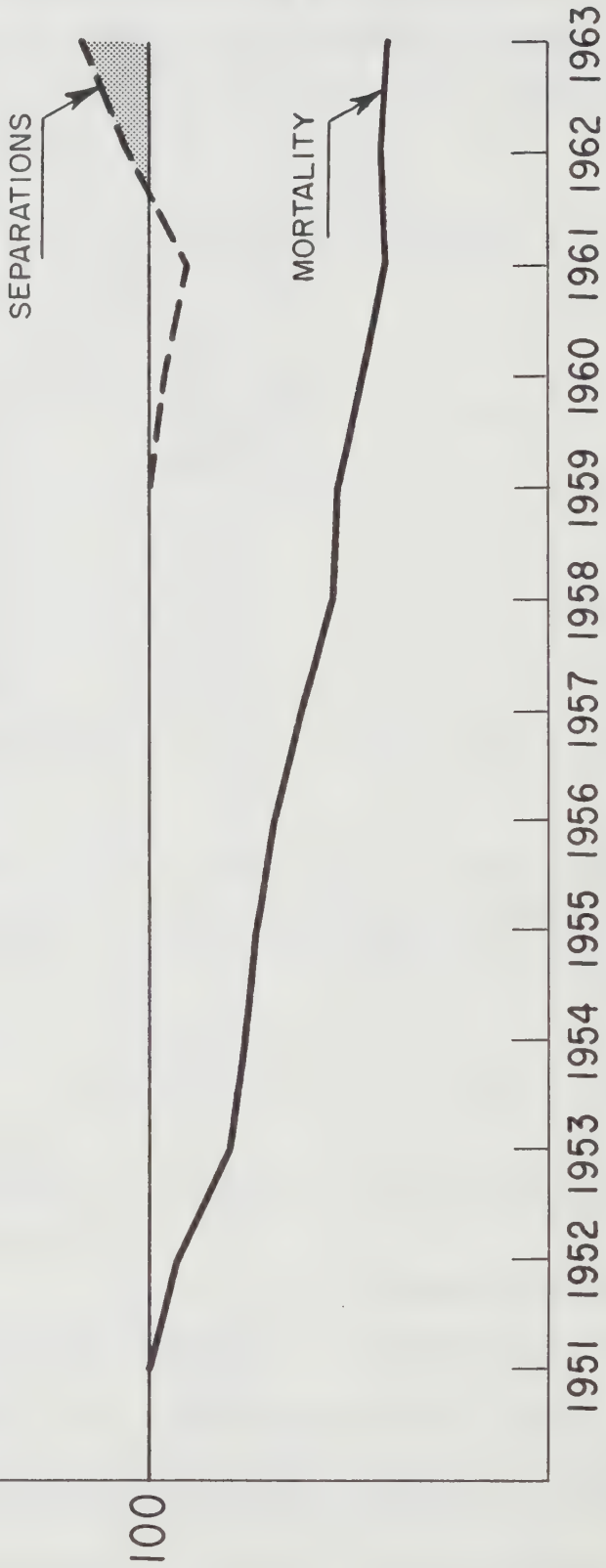
| | 1951 | 1961 | Per Cent Increase |
|------------|------|------|-------------------|
| Both sexes | 61.4 | 71.6 | 16.6 |
| Male | 58.3 | 70.9 | 21.6 |
| Female | 64.6 | 72.5 | 12.2 |

FIGURE — 30

PERCENTAGE CHANGE IN RATES OF MORTALITY AND HOSPITAL SEPARATIONS

1951 — 1963

SYMPTOMS, SENILITY AND ILL-DEFINED CONDITIONS



Source: Table 44.

Incidence and Prevalence of Symptoms, Senility and Ill-defined Conditions According to the Canadian Sickness Survey 1950-51:

The rates for symptoms related to certain systems may, for some purposes, be added to the corresponding figures for these systems since the survey technique did not always permit a clear distinction between diseases and symptoms referable to certain systems.

| | Persons Developing New Illness during Year, per 100,000 Population | Persons Sick Any Day, per 100,000 Population |
|--|---|---|
| <u>All Symptoms, Senility and Ill-defined Conditions.....</u> | 17,180 | 2,470 |
| Symptoms referable to nervous system and special senses | 770 | 110 |
| Symptoms referable to cardiovascular and lymphatic system..... | 740 | 60 |
| Symptoms referable to respiratory system .. | 2,640 | 220 |
| Symptoms referable to upper gastro- intestinal tract..... | 1,180 | 50 |
| Symptoms referable to abdomen and lower gastro-intestinal system..... | 2,770 | 120 |
| Symptoms referable to limbs and back | 4,240 | 700 |
| Nervousness and debility..... | 1,730 | 540 |
| Headache..... | 4,260 | 320 |
| Other ill-defined symptoms and conditions..... | 2,790 | 340 |

Symptoms, Senility and Ill-defined Conditions in Canada and Selected Other Countries:

International comparisons are affected by differences in recording practices that impair the quality of the resulting statistics. Canada's mortality rate ascribed to this group is the lowest among the selected countries:

| | Death Rate per 100,000 Population (1959) |
|-------------------|---|
| Canada | 8.8 |
| United States | 10.8 |
| England and Wales | 17.2 |
| France | 167.6 |
| Sweden | 24.9 |

| | Death Rate per 100,000 Population (1959) |
|--------|---|
| Mexico | 138.9 |
| Ceylon | 201.2 |

Symptoms, Senility and Ill-defined Conditions and Their Share of Total Illness and Health Care:

The group’s apparent share in illness and demand for health services must be interpreted with care, bearing in mind the above qualifications.

The percentage is lowest in regard to mortality and hospital use, the two series which are based on well established record systems. The data on illness days, both disabling and non-disabling, are based on lay information. The often minor causes of non-disabling illness may be due to vague symptoms such as headaches or pains, not diagnosed by a physician, and therefore not recognizable as a specific disease entity under any other heading.

The respective percentages are as follows:

| | Per Cent |
|-----------------------|----------|
| All deaths | 0.9 |
| Premature mortality | 0.6 |
| Disabling illness | 8.1 |
| Non-disabling illness | 17.0 |
| Hospital separations | 1.9 |
| Hospital days | 0.9 |
| Physicians’ services | 6.6 |
| Prescriptions | 5.4 |
| Home nursing | 4.3 |

ACCIDENTS, POISONING, AND VIOLENCE

This group deals with injuries inflicted on the body by the extraneous circumstances mentioned in the title. In this respect the injuries differ from the health problems discussed in the foregoing sections: unlike the diseases reviewed there, injuries do not stem from malfunctions in the body or mind but from situations or occurrences which as such would bear no relation to a person’s health. Hence, the causes of accidents, which form the bulk of this group, and violence have been considered in the past as lying outside the area of medical concern which has been limited to the treatment of the resulting injuries. This has changed, however, since injuries as a result of accidents have developed into one of our major health problems. It is becoming increasingly recognized and accepted that there is such a thing as the epidemiology of accidents; that medical science can contribute to

their control by studying the physical and mental conditions leading to accidents and violence. Nevertheless, the causation of accidents is not primarily a medical problem and one sympathizes with the medical profession in its difficulty of delineating medical responsibility in this field.¹

Table 45 and Figure 31 show little change in mortality from accidents and the incidence of hospitalization until the late 1950's when mortality began to decline slowly until the slight rise in 1963, and hospital separations began to rise gradually.

TABLE 45
ACCIDENTS, POISONING, AND VIOLENCE,
RATES OF MORTALITY AND HOSPITAL SEPARATIONS, AND INDICES,
CANADA, 1951-1963

| Year | Deaths | | Hospital Separations | |
|-----------|--|-----------------------|--|-----------------------|
| | Rate per 100,000 Population ¹ | Per Cent of 1951 Rate | Rate per 100,000 Population ² | Per Cent of 1951 Rate |
| 1951..... | 66.3 | 100.0 | 1,608 | 100.0 |
| 1952..... | 67.8 | 102.3 | 1,687 | 104.9 |
| 1953..... | 66.8 | 100.8 | 1,656 | 103.0 |
| 1954..... | 63.6 | 95.9 | 1,624 | 101.1 |
| 1955..... | 64.5 | 97.3 | 1,608 | 100.0 |
| 1956..... | 66.4 | 100.2 | 1,673 | 104.0 |
| 1957..... | 66.7 | 100.6 | 1,651 | 102.7 |
| 1958..... | 62.2 | 93.8 | 1,671 | 103.9 |
| 1959..... | 62.4 | 94.1 | 1,670 | 103.9 |
| 1960..... | 61.8 | 93.2 | 1,720 | 107.0 |
| 1961..... | 61.6 | 92.9 | 1,760 | 109.5 |
| 1962..... | 62.9 | 94.9 | 1,780 | 110.7 |
| 1963..... | 63.2 | 95.3 | 1,820 | 113.2 |

¹ Dominion Bureau of Statistics, annual reports of Vital Statistics, Ottawa: Queen's Printer, various years.

² Department of Public Health, annual reports of Saskatchewan Hospital Services Plan, Regina: Queen's Printer, various years.

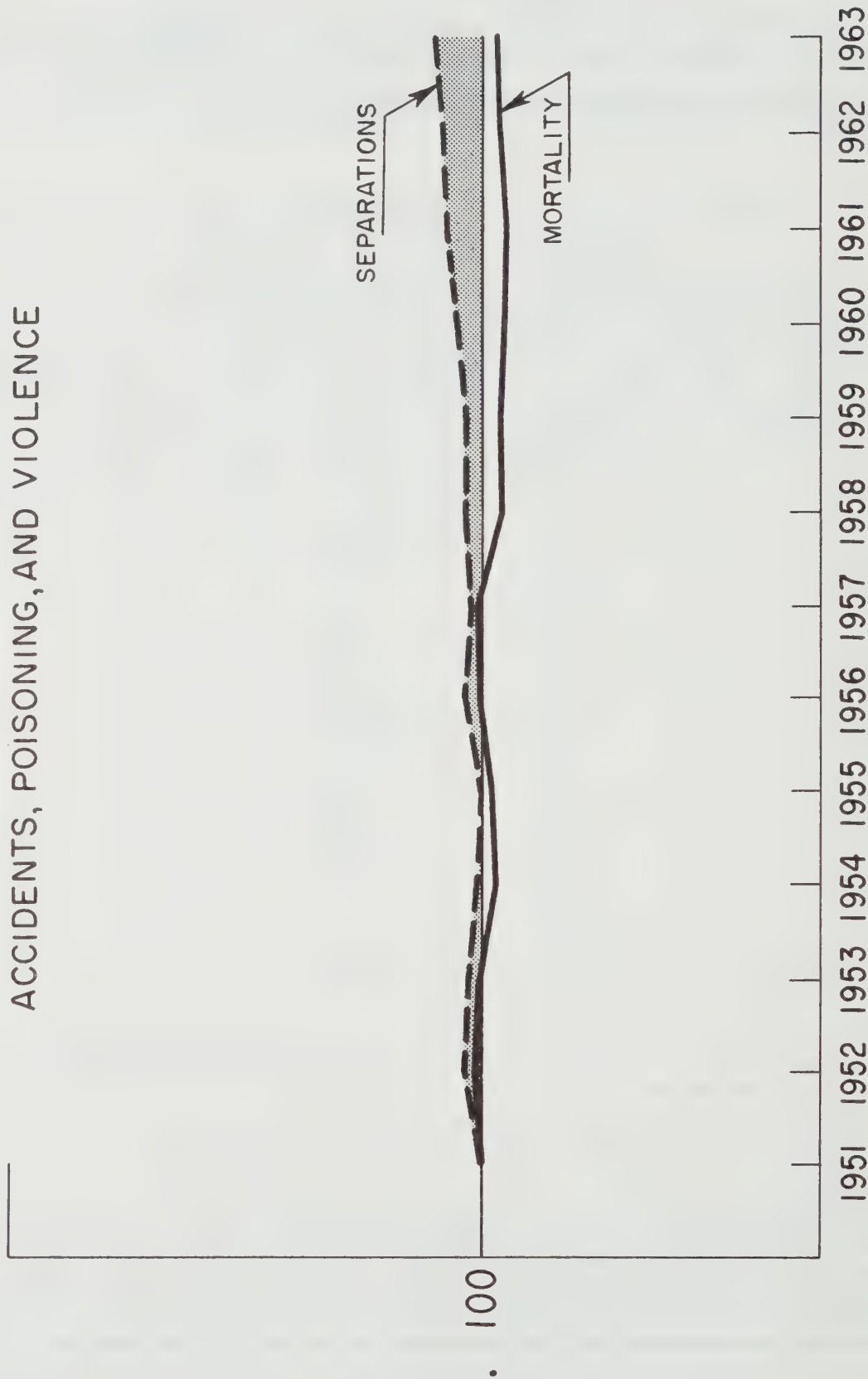
¹ See editorial in the Canadian Medical Association Journal, July 15, 1959, Vol. 81, p. 112: "...a great number of demands are made upon our profession nowadays to show leadership and take the initiative in reforming society. We are required, for example, to deal with the growing army of alcoholics in our midst and to dissuade the young from the abuse of tobacco. We are expected to stop executives from killing themselves with overwork and overeating, to transform homosexuals into heterosexuals and to change sexual offenders, by surgery and psychiatry, into law-abiding citizens. The editor of a learned contemporary has recently requested us to assist in the abolition of boxing, and some think that we should take the lead in stamping out that other form of slaughter, the automobile accident. Now all these problems certainly have a medical angle, but we can scarcely be expected to deal with them alone. We have the good of the people at heart, but what if they do not want to be done good to! If people want to get fat and lazy, or drink themselves to death or hit each other, what are the limits of our responsibility to them?"

FIGURE — 31

PERCENTAGE CHANGE IN RATES OF MORTALITY AND HOSPITAL SEPARATIONS

1951 — 1963

ACCIDENTS, POISONING, AND VIOLENCE



Source: Table 45.

For the study of accidents, a dual classification of the causes is available so that they can be categorized either by the external cause (e.g., motor vehicle accidents, accidents caused by fire or drowning, etc.) or by the nature of the injury (e.g., fracture, laceration, burn, etc.). Some statistics of accidents in terms of their external causes are given here in order to outline broadly the circumstances under which accidents occur.

In 1963, the deaths from causes in this group were distributed as follows: ¹

| | Number of Deaths | Per Cent of Total |
|---|---------------------|----------------------|
| All Accidents, Poisoning, and Violence ... | 11,938 | 100.0 |
| Motor vehicle accidents | 4,451 | 37.3 |
| Accidental falls | 1,564 | 13.1 |
| Suicide | 1,436 | 12.0 |
| Accidental drowning | 839 | 7.0 |
| Transport accidents (other than motor vehicle)..... | 655 | 5.5 |
| Drowning involving watercraft 291 | | |
| Other transport 364 | | |
| Accident caused by fire and explosion | 584 | 4.9 |
| Accidental poisoning..... | 384 | 3.2 |
| Accident caused by machinery..... | 236 | 2.0 |
| Homicide | 244 | 2.0 |
| Accident caused by firearm | 150 | 1.3 |
| Accident caused by hot substance, corrosive liquid, steam and radiation | 42 | 0.4 |
| Injury resulting from operations of war | 3 | — |
| All other accidental causes | 1,350 | 11.3 |

Over the years, the mortality rate from motor vehicle accidents, which now account for more than one-third of all accidents, has increased whereas other accident death rates have declined or remained stationary: ²

Accidental Death Rates Per 100,000 Population,
Canada 1926 - 1963

| | 1926 - 1930 | 1936 - 1940 | 1946 - 1950 | 1956 - 1960 | 1963 |
|---|-------------|-------------|-------------|-------------|------|
| Motor vehicle..... | 10.5 | 14.0 | 15.8 | 21.3 | 23.6 |
| Falls | 8.6 | 16.3 | 13.1 | 9.2 | 8.3 |
| Transport (other than motor and rail)..... | 4.7 | 2.4 | 3.3 | 2.8 | 2.9 |
| Poisoning..... | 1.5 | 1.5 | 2.0 | 1.9 | 2.0 |
| Railway | 4.0 | 2.0 | 1.7 | 0.9 | 0.5 |
| Other accidents..... | 29.6 | 19.7 | 22.9 | 19.1 | 16.9 |
| Total..... | 58.8 | 55.9 | 58.9 | 55.1 | 54.3 |

¹ Based on Dominion Bureau of Statistics, Vital Statistics 1963, Ottawa: Queen's Printer, 1965, pp. 124 and 125.

² Ibid., p. 25; see also Kohn, R., "Traffic Accidents as a Public Health Problem", Canadian Journal of Public Health, October 1965.

Accidents account for about 8 per cent of all deaths, motor vehicle accidents alone for about 3 per cent. These 3 per cent represented in 1963 about 4,500 lives lost in one year, a loss which is compounded by the fact that traffic accidents often strike in the prime of life. In 1961, the over-all mean age at death in Canada was 61, but for deaths from motor vehicle accidents, the average was 35. This is not surprising in view of the fact that accidents (all accidents) are by far the leading cause of death in the age groups from one to forty-four years according to the classification used in the Vital Statistics of the Dominion Bureau of Statistics.¹ According to tabulations prepared by the Bureau² for the year 1961, the age-specific death rate from traffic accidents was highest (40.6) in the age group 20-24; it is fairly uniform during the remaining ages between 15 and 65 (about 20 to 25 per 100,000 population) but climbs to about 40 again after the age of 65. In the age group 20-24, otherwise one of the healthiest ages, 40 per cent of all deaths are due to motor vehicle accidents. Whereas the average age at deaths from most causes has increased, the mean age at death from accidents has decreased as shown below. Several studies strongly indicate that the use of alcohol is a major factor in the causation of traffic accidents.³

In rural areas the tractor is a source of frequent and serious accidents. In Saskatchewan, with a population of about 900,000, there were 9 fatal tractor accidents in 1962 (2 of them among children under 5 years of age); in the same year, 278 cases were hospitalized for injuries resulted from tractor or combine accidents (46 of them among children under 15 years of age).⁴ After the motor car, the tractor and tractor-drawn equipment, were the objects most frequently involved in farm accidents studied in Ontario.⁵

Although the number of fatal railway accidents has been declining steadily, there were still about 150 people killed in 1963 in railway accidents.

Falls are the most common cause of accidental death among the aged,⁶ and they are a major cause of accidents both at work and in the home. Of workmen's compensation claims in Ontario, 26.4 per cent were due to falls and slips⁷ and of 1,000 home accidents studied, 40.9 per cent involved falls.⁸

¹ Ibid., p. 23.

² Unpublished material supplied by the Dominion Bureau of Statistics.

³ For instance, Reid, W.S., panel on "Alcohol and Road Traffic", Proceedings of the Forty-Fourth Convention, Canadian Good Roads Association, Winnipeg 1963, p. 133; Hopkinson and Widdowson, British Medical Journal, December 19, 1964, as quoted in Canadian Medical Association Journal, March 13, 1965, p. 581; Health Information Foundation, "Accidents in the United States", Progress in Health Services, October 1957, p. 5; Metropolitan Life Insurance Company, "The 1964 Company Awards for Safety Research", Statistical Bulletin, October 1964, p. 2.

⁴ Saskatchewan Department of Public Health, Saskatchewan Accident Facts 1962, pp. 25 and 41.

⁵ Ontario Department of Agriculture, Ontario Farm Accident Survey, Toronto: the Department, pp. 26-28.

⁶ Dominion Bureau of Statistics, Vital Statistics 1963, Ottawa: Queen's Printer, 1965, p. 25.

⁷ Workmen's Compensation Board, Ontario, 1963 Annual Report, Toronto: Queen's Printer, 1964, p. 49.

⁸ Lossing, E. H., Goyette, R. B., "Review of 1,000 Home Accidents", Canadian Journal of Public Health, April 1957, p. 133.

Suicide ranks high among the causes of death in this group but, as generally for accidental and violent injury, the health agency can only partly contribute to the control and cannot do it without the collaboration of other interested bodies. Nevertheless, there has been a strong feeling that suicide has been neglected as a health problem and that the health services could play a larger role in its prevention.¹

Accidental poisoning is caused largely by the misuse of medicines. A study in Syracuse, New York, showed that 59 per cent of the cases reviewed were caused by medicines, with aspirins alone accounting for 31 per cent (five-sixths of these due to flavoured aspirins).² The most vulnerable group appears to be children between one and five years of age, according to both the Syracuse study³ and the study of home accidents in the Ottawa-Hull area,⁴ as well as a study based on the reports of the United States Clearinghouse for Poison Control Centers.⁵

The 839 accidental fatal drownings shown in the foregoing do not include 271 deaths due to drownings involving small boats which the statistics include under transport accidents (other than motor vehicle).

Three deaths occurred in 1963 as the result of injuries resulting from operations of war. Three deaths out of a total of almost 150,000 is a very small number but, like the one case of smallpox, they serve as a grim reminder of what an epidemic of war can do. Some consider war as a problem originating in the mind of people, very much like other forms of asocial behaviour. To that extent it too becomes a health problem, though one which cannot be solved within the boundaries of one country but requires the broader approach described above when speaking of health in Canada and elsewhere. In contrast to the three lives lost during the "peaceful" year of 1963, the epidemic of the second World War cost Canada 39,300 lives of persons killed or missing,⁶ and Canada then was not even a theatre of war so that there were no civilian losses. The United Kingdom, on the other hand, lost in addition to some 300,000 military casualties (killed or missing), 60,600 from among the civilian population, including 25,400 women and 7,700 children under 16 years of age.⁷

¹ Dublin, L. I., "Suicide; A Public Health Problem", Felix, R., "Suicide: A Neglected Problem", Shneidman, E.S., and Farberow, N.L., "The Los Angeles Suicide Prevention Center: A Demonstration of Public Health Feasibilities", all in *American Journal of Public Health*, January 1965, pp. 12-26.

² Wehrle, P.F., et al., "The Epidemiology of Accidental Poisoning in an Urban Population", *American Journal of Public Health*, December 1960, p. 1926.

³ *Ibid.*, p. 1929.

⁴ Lossing, E. H., Goyette, R. B., *op. cit.*, p. 138.

⁵ Cann, H. M., et al., "Epidemiological Aspects of Poisoning Accidents", *American Journal of Public Health*, December 1960, p. 1923.

⁶ "War Losses", *Miscellany*, *Canadian Medical Association Journal*, October 1946, p. 404.

⁷ *Ibid.*

With accidents accounting for a substantial proportion of morbidity and the demand for health services, the question of their prevention assumes considerable importance. The degree to which accidents are preventable is difficult to specify. By some stretch of imagination it could be said that most injuries, even those due to natural catastrophes could be avoided if houses were built strong enough to withstand them, if people stayed away from potentially dangerous areas, and so forth. But practically speaking some accidents are unavoidable as are some accidents resulting from man-made situations. There is no doubt, on the other hand, that many accidents can be prevented by what may be called normal foresight and precaution. It is important though to distinguish between precautions that can be taken by the individual, i.e., the potential victim, and those that require, possibly in addition, the action of others. If we read that in the case of accidental poisonings, the products ingested "were not in their original storage places, but were found on furniture tops and on the floor",¹ it is safe to accept Lossing's and Goyette's finding that three-quarters of the home accidents could have been prevented, 5 per cent did not seem preventable with normal forethought, and in 19 per cent, the preventability was in doubt.²

Health agencies alone cannot prevent accidents but they can contribute to prevention to a greater extent than they have done in the past. In discussing the role of the physician in regard to traffic safety, the Canadian Medical Association urges the doctor "to take advantage of the unique contact he has with many citizens and apply a gentle consistent pressure, at opportune moments, toward the goal of sanity on the highways".³ It is in the field of health education that the doctor's role is seen:

"... the individual physician's major contribution, which can be undertaken immediately, is an extension of his ancient role as teacher. In his office and the patient's home, he can give instruction that would contribute to traffic safety, especially among high-risk groups such as young drivers, and very young and very old pedestrians. Despite the multiplication of agencies, the doctor is still the single most influential in health education and professional advice... will have an effect unlikely to be duplicated by any other community agency."⁴

The same applies to other accidents but the physician's contact with the accident-prone individual is limited. The mention of health education leads to the functions of the traditional public health agencies which have two of their basic techniques to contribute: the epidemiological method of study and health education or, as Imrie puts it in regard to home accident prevention, investigation and parent education.⁵ A team headed by Dr. Read at the University of British

¹ Cann, H. M., et al., op. cit., p. 1924.

² Lossing, E. H., Goyette, R.B., op. cit., p. 140.

³ "Physicians and Traffic Safety", editorial, Canadian Medical Association Journal, June 20, 1964, p. 1422.

⁴ Ibid.

⁵ Imrie, R. J., "Home Accident Prevention", Canadian Journal of Public Health, July 1964, pp. 276 - 277.

Columbia conducted a study of child pedestrian traffic accidents and concluded their study by saying:

“We are convinced that a preventive programme based on epidemiological principles can be successful in greatly diminishing pedestrian traffic accidents.”¹

Mortality data “can reveal much information which helps to delineate the problem and assists in program planning”² for accident prevention. Through the experience from the cases treated in their emergency wards and the resulting records, hospitals have a unique opportunity to play a role not only in treating but also in contributing to the study and prevention of accidents.³ In short, “the same public health techniques can be applied to accident prevention as to other health problems.”⁴ That all this applies not only to the medical profession and the official health agencies was recognized by the Royal Commission on Health Services which, speaking of voluntary agencies, recommended “that agencies concerned with the prevention of accidents participate in the work of the Health Planning Councils at the various levels and in particular with regard to measures to prevent highway accidents”.⁵

Statistical Summary

Mean Age at Death from Accidents, Poisoning, and Violence:

During the period from 1951 to 1961, when the mean age at death from all causes had risen from 57.3 to 61.0 (a rise of 6.5 per cent), the corresponding figures for deaths from accidents, poisoning, and violence showed a decline:

| | 1951 | 1961 | Per Cent Change |
|------------|------|------|-----------------|
| Both sexes | 40.8 | 39.8 | -2.5 |
| Male | 39.2 | 38.2 | -2.6 |
| Female | 45.3 | 44.2 | -2.2 |

For motor vehicle accidents the mean age at death is lower and the decrease in the mean age was still more pronounced for males but had risen for females:

| | 1951 | 1961 | Per Cent Change |
|------------|------|------|-----------------|
| Both sexes | 35.3 | 34.6 | -2.0 |
| Male | 36.4 | 34.9 | -4.1 |
| Female | 31.8 | 33.8 | +6.3 |

¹ Read, J. H., et al., *Pedestrian Traffic Accidents Involving Children in the City of Vancouver, Canada*, Vancouver: University of British Columbia, mimeographed, p. 159.

² Iskrant, A. P., “Accident Mortality Data as Epidemiological Indicators”, *American Journal of Public Health*, February 1960, p. 172.

³ Keddy, A. J., “Childhood Accidents”, *Canadian Hospital*, December 1963, p. 53.

⁴ Macleod, K. I. E., “Toward Solving the Accident Problem”, *Public Health Reports*, July 1961, p. 614.

⁵ Report of the Royal Commission on Health Services, Vol. II, Ottawa: Queen’s Printer, 1965, p. 174.

Incidence and Prevalence of Accidents, Poisoning, and Violence According to the Canadian Sickness Survey 1950-51:

No breakdown by the external causes of accidents is available.

| | Persons Developing New Illness during Year, per 100,000 Population | Persons Sick Any Day, per 100,000 Population |
|--|---|--|
| All accidents, poisoning, and violence | 10,700 | 770 |

Accidents in Canada and Selected Other Countries:

The death rates shown refer to accidents only, omitting poisoning and violence. The Canadian rate in 1959 was slightly higher than that of the United States, substantially higher than that of England and Wales, and Sweden and that of Ceylon.

| | Death Rate per 100,000 Population (1959) |
|-------------------|---|
| Canada | 54.1 |
| United States | 52.2 |
| England and Wales | 38.1 |
| France | 60.7 |
| Sweden | 40.1 |
| Mexico | n.a. |
| Ceylon | 30.7 |

Accidents, Poisoning, and Violence and Their Share of Total Illness and Health Care:

Accidents rank high as causes of mortality -- they are the main cause of deaths among the younger age groups -- and as causes of non-fatal illness; they also take up a substantial part of our health services.

The high toll in terms of life years lost due to premature mortality is due to the high rate of fatal accidents among children and young adults. Accidents have taken the place of the infectious diseases by killing and injuring people in their prime of life. Of the 11,229 deaths due to accidents in 1961, 3,882 (or 34.6 per cent) were due to motor vehicle accidents, the remainder to accidental falls, drownings, fires, and other causes. The respective percentages are as follows:

| | Per Cent |
|-----------------------|----------|
| All deaths | 7.9 |
| Premature mortality | 14.3 |
| Disabling illness | 5.7 |
| Non-disabling illness | 4.4 |
| Hospital separations | 7.6 |
| Hospital days | 4.7 |

| | Per Cent |
|----------------------|----------|
| Physicians' services | 6.7 |
| Prescriptions | 4.5 |
| Home nursing | 3.4 |

SUPPLEMENTARY CLASS

This group has been added to the classification of diseases and injuries in order to account for health care given without relation to a specific illness or an actually existing condition. Included under this heading are, for instance, the days of normal newborn care in the hospital, well-baby care by physicians, X-ray or laboratory examinations without evidence of illness or injury, immunization and similar procedures. On the whole, we probably do not go too far wrong if we label these services as preventive. It must be remembered, however, that the vast amount of preventive services provided by the public health agencies both as personal services to the individual (e.g., immunizations) and on a community basis, are not included in this account. And immunization procedures, normal maternity and well-baby care are performed by the public health services as well as private physicians.

In regard to physicians' services, leRiche estimates that under the Physicians' Services incorporated between 13.26 and 16.51 per cent of the disbursements are allocated to "physiological and preventive" services, including obstetrical services and services in respect to symptoms and ill-defined illness.¹ This, however, is a broader meaning of prevention than the one used here. A still broader interpretation includes as preventive also services, including certain surgery, provided to prevent complications or the worsening of an existing condition.

An analysis was made of the situations in which physicians' services were provided without a record of sickness, according to the Canadian Sickness Survey 1950-1951.² This survey is certainly outdated now as far as the volume of such services is concerned since wider participation in prepayment plans has eased the access to physicians for periodic examinations, immunizations, and other care of the well. But as far as the distribution of these services is concerned, the Sickness Survey pattern may not have changed too much. According to the Survey, only very few of the preventive calls, about 4 per cent, were home calls, more than two-thirds of them to women in the childbearing ages and thus probably related to normal maternity care. Of the "well" office calls too, women aged 15 to 44 account for higher proportions than the men in this age group, and of office calls by children under 15 years of age about 29 per cent were presumably of a preventive nature (immunization, routine examination, etc.,) for both boys and girls. In all, of the "well" calls at the physician's office about one-half were by women in the childbearing ages and about one-quarter by well children.

¹ leRiche, H. W., op. cit., p. 32.

² Kohn, R., "Some Patterns of Medical Care in Canada, Part II", Canadian Journal of Public Health, April 1957, pp. 141-145.

This is similar to the pattern found in England.¹ At the time of the Sickness Survey, people in the low income group got only about 60 per cent of the preventive care received by other income groups despite the possibly greater need because of larger family size. It should be noted that Sickness Survey data understate preventive calls to the extent that routine calls discovering a disease condition would no longer be counted as preventive.

This group of services accounts for the following percentages of all health care:

| | Per Cent |
|----------------------|------------------|
| Hospital separations | 13.9 |
| Hospital days | 5.2 |
| Physicians' services | 4.7 ² |
| Prescriptions | 12.5 |
| Home nursing | 18.0 |

IMPAIRMENTS

In order to study the impact of various health problems on the community and on the health services in particular, it is customary and useful to review the experience during one year. This practice has been followed in the foregoing part of this chapter where the emphasis has been on annual rates.

Such an approach, however, does not fully reflect the effect of either good or ill health on the individual. Reference was made previously to the need for longitudinal observations and measurements in order to determine what happens to the same individual or the same group of individuals over a period of years, possibly their entire lifetime. For example, any 365 days of disability found in the population during a year could represent 365 people, each disabled for one day, or they may be the experience of one individual disabled for the entire year. Anyone found incapacitated for a whole year is likely also to have been incapacitated before the beginning of that year and his incapacity is likely to continue at least for some time after the end of the particular year for which the statistics are compiled. The health and other social needs of the long-term disabled are very different from those whose incapacity lasts only a day or two. This is one reason for dealing separately with long-term or permanent handicaps.

Another reason is that the existence or the effect of impairments may be obscured in a statistical review of disability where compensating treatment or devices have removed or reduced the actual disability although continued care is needed.

¹ Logan, W. P. D., "General Practitioners' Records", Studies on Medical and Population Subjects No. 7, General Register Office, London: H.M.S.O., 1953.

² Based on leRiche, H. W., op. cit., p. 80 (services include refractions which account for 41 per cent of the cost of services in this group). (Ibid., p. 54).

There is, furthermore, a basic difference between impairments and the causes of illness and death as they have been discussed so far. When we speak of impairments or handicaps, we are dealing with the consequences rather than the causes of disease or injury. Identical handicaps may be the result of widely different diseases or injuries. The absence of a limb, for instance, may have been caused by injury, by congenital malformation, or by amputation in the course of treatment of a disease. Treatment and rehabilitation services at this stage will be for similar handicaps regardless of the original cause. In many, though not all of these cases, the possibilities of treatment for the underlying disease or injury will have been exhausted, and the remaining needs are mainly for compensating devices, medical restoration and social rehabilitation.

In order to assess the need for these restorative and rehabilitative services, a new dimension has to be introduced into the health statistics by taking counts of persons with various kinds of impairments where the emphasis is on the type and degree of the residual handicap rather than its causes. This is a different dimension because it cuts across the previously used classification of health problems in terms of the causative disease or injury. Nor is the concept of impairment or handicap synonymous with illness. Disabilities not causing pain or continuous discomfort, or compensated impairments, are often not considered and hence not counted as illness. Examples are impairments of sight or hearing if compensated by glasses or hearing aids, or the loss of a limb if compensated by a prosthetic device.

An attempt to estimate present and future needs for rehabilitation services, appliances, special educational and employment facilities, and institutional services is hampered by the limited data available for Canada. This represents a serious gap in our health statistics which must be remedied before not only an adequate assessment can be made of the health needs in this area but also before studies of the etiology and epidemiology of the various impairments can succeed.

Existing data may suffice, however, to suggest the order of magnitude of the problem and to identify some of the major problem areas. The important criteria in evaluating health and social needs in respect to impairments are: (1) the nature or type of impairment, (2) its degree, and (3) its duration.

The Canadian Sickness Survey 1950-1951 produced some data on the prevalence of permanent physical disabilities in Canada. The rates and their application to Canada's 1961 population are shown in Table 46. There are in Canada somewhere around one and one-quarter million people with permanent physical handicaps. Of these, about 56 per cent are of minor or moderate nature, 44 per cent are classified as severe or total.¹ Those severely or totally

¹ The severity groups of the chronic disabilities, deformities, and amputations enumerated in the original survey are defined as follows: minor - not interfering to any practical extent in the day-to-day functioning on the job or at home; moderate - appearing to have only a localized effect on conduct in daily employment or at home but not seriously affecting a person's general way of life; severe - interfering considerably with work or normal home responsibilities (persons in this group were not totally bedridden but generally had to take life easily, take much extra rest, or be confined to bed during acute phases of disability); total - largely necessitating confinement to bed, a wheelchair or a sitting position (in addition, assistance was usually required in carrying out the simple functions of everyday living), (Department of National Health and Welfare and Dominion Bureau of Statistics, op. cit., p. 25).

handicapped as a result of chronic disability, deformity, or amputation number over half a million. From the nature of the original survey it appears that this is a conservative estimate because of the reluctance to report certain disabilities to an interviewer and also because long-term patients in institutions may not have been included in the household information.¹

TABLE 46

PERMANENT PHYSICAL DISABILITIES, ESTIMATED NUMBER AND RATE PER 1,000 POPULATION BY AGE GROUP, BY SEVERITY, CANADA, 1961¹

| Age Group | All Severity Groups | | Minor and Moderate Disabilities | | Severe and Total Disabilities | |
|------------------|---------------------|------|---------------------------------|------|-------------------------------|------|
| | Number | Rate | Number | Rate | Number | Rate |
| All ages..... | 1,295,000 | 71 | 730,000 | 40 | 565,000 | 31 |
| Under 15..... | 111,000 | 18 | ... | ... | ... | ... |
| 15-24..... | | ... | 42,000 | 16 | ... | ... |
| 25-44..... | 297,000 | 61 | 190,000 | 39 | 107,000 | 22 |
| 45-64..... | 415,000 | 131 | 238,000 | 75 | 177,000 | 56 |
| 65 and over..... | 355,000 | 255 | 142,000 | 102 | 213,000 | 153 |

¹ Based on Department of National Health and Welfare and the Dominion Bureau of Statistics, *Illness and Health Care in Canada, Canadian Sickness Survey, 1950-1951*, Ottawa: Queen's Printer, 1960, and Dominion Bureau of Statistics, *Census 1961*, Ottawa: Queen's Printer, 1963.

Note: . . . Means survey sample insufficient for estimates.

The primary causes of all disabilities, whether minor or severe, were shown as being distributed as follows:²

| | Per Cent | Estimated Number of Cases in 1961 |
|------------------------------------|----------|-----------------------------------|
| All Causes | 100.0 | 1,290,000 |
| Heart disease | 13.1 | 169,000 |
| Impairments due to accidents | 12.6 | 162,000 |
| Arthritis and rheumatism | 11.9 | 154,000 |
| Deafness | 7.6 | 98,000 |
| Blindness and near-blindness | 6.9 | 89,000 |
| Chronic diseases of nervous system | 5.9 | 76,000 |
| Other causes | 42.0 | 542,000 |

¹ The rate of impairments found in the United States National Health Survey is about twice as high (141.4) as the Canadian rate (71) but the concept used there is somewhat broader and the rate also includes mental disorders (United States Department of Health, Education, and Welfare, *Health Statistics - Impairments by type, sex, and age, United States, July 1957-June 1958*, Washington, D.C.: United States Government Printing Office, 1959, p. 8).

² Based on Department of National Health and Welfare, Dominion Bureau of Statistics, *op. cit.*, p. 114.

Of the 565,000 severe or total disabilities, the survey tells us only that 19.1 per cent (or slightly over 100,000 in 1961) were due to heart disease, and 11.8 per cent (or some 60,000 in 1961) to arthritis and rheumatism.

Since the data quoted above are limited to physical disabilities, it is necessary to turn to other sources to determine the extent of long-term disability due to psychiatric disorders. No survey has as yet been undertaken to obtain this information for the population of Canada as a whole. Among psychiatric patients in institutions on a given day, ¹ some 33,000 had been in the institution for more than 3 years, ² and another 10,000 for over one year on the census day. On the same day, there were nearly 20,000 ³ mentally deficient patients in institutions. This total of some 50,000 to 60,000 does not include the considerable number of the chronic mentally disabled outside the institutions. ⁴

Statistics available from other sources contribute little to our knowledge of the total numbers of persons with certain disabilities, but they shed some light on the relative frequencies of various types of handicaps. Comparability is impaired though by the selectiveness of the programmes from which the data come and by the use of different concepts and to some degree also classifications.

Regarding the totally and permanently handicapped, some information is available from the medical statistics of applicants for Allowances for Disabled Persons in Canada. ⁵ These statistics relate to persons entering the programme, as distinct from those receiving the allowances at a given point of time. They represent, therefore, not a cross section of the group of people in receipt of allowances whose characteristics will vary from those of the new applicants because of varying survival rates, changing conditions, and perhaps also changing diagnostic classification and administrative practices. We are dealing here with a highly selected group of people; they are generally in the age group 18 to 64, thus omitting children and the vulnerable group of the aged; they are people who have passed the means test in order to qualify for the allowance; they exclude most of those staying in hospitals, homes for the aged and other custodial institutions. ⁶ A similarly selected group are those applying for Allowances for Blind Persons.

Table 47 shows the percentage distribution of the causes of disability among those granted the allowances during the three fiscal years ending March 31, 1958 to 1960.

These figures do not reflect the actual prevalence of the various causes but only their relative ranking within this particular population group. Nor do small changes over a period of two or three years necessarily indicate definite trends. For certain causes, however, the trend has been one of consistent change either upwards or downwards.

¹ December 31, 1960, is the latest date for which figures are available.

² Based on Dominion Bureau of Statistics, *Mental Health Statistics, Supplement: Patients in Institutions*, Ottawa: Queen's Printer, 1960, p. 43.

³ 19,590, *ibid.*

⁴ See pp. 206-207.

⁵ Department of National Health and Welfare, *Allowances for the Permanently and Totally Disabled -- Medical Statistics -- April 1, 1957 to March 31, 1960*, Ottawa: The Department, 1961.

⁶ Those who are pay residents in full or in part are entitled to receive the allowances.

TABLE 47

NUMBERS AND PERCENTAGES GRANTED DISABILITY AND BLIND ALLOWANCES,
BY CAUSE OF DISABILITY, CANADA, FISCAL YEARS 1957-1958 TO
1959-1960¹

| Cause Group No. | 1957-1958 | | 1958-1959 | | 1959-1960 | |
|--|-----------|----------|-----------|----------|-----------|----------|
| | No. | Per Cent | No. | Per Cent | No. | Per Cent |
| 1. Infective and Parasitic Diseases..... | 848 | 5.70 | 573 | 4.60 | 248 | 3.14 |
| 2. Neoplasms | 466 | 3.13 | 458 | 3.67 | 360 | 4.55 |
| 3. Allergic, Endocrine System, Metabolic and Nutritional Diseases..... | 937 | 6.30 | 604 | 4.85 | 219 | 2.77 |
| 4. Diseases of the Blood and Blood-forming Organs | 54 | 0.36 | 43 | 0.35 | 23 | 0.29 |
| 5. Mental, Psychoneurotic and Personality Disorders..... | 3,295 | 22.14 | 3,146 | 25.24 | 2,370 | 29.98 |
| 6. Diseases of the Nervous System and Sense Organs.. | 3,273 | 21.99 | 3,321 | 26.65 | 2,261 | 28.60 |
| 7. Diseases of the Circulatory System..... | 2,950 | 19.82 | 2,284 | 18.33 | 1,237 | 15.65 |
| 8. Diseases of the Respiratory System..... | 354 | 2.38 | 278 | 2.23 | 189 | 2.39 |
| 9. Diseases of the Digestive System..... | 207 | 1.34 | 124 | 0.99 | 57 | 0.72 |
| 10. Diseases of the Genito-Urinary System..... | 140 | 0.94 | 90 | 0.72 | 51 | 0.65 |
| 11. Deliveries and Complications of Maternity | — | — | — | — | — | — |
| 12. Diseases of the Skin and Cellular Tissue | 41 | 0.28 | 42 | 0.34 | 13 | 0.16 |
| 13. Diseases of the Bones and Organs of Movement | 1,504 | 10.11 | 1,065 | 8.54 | 594 | 7.52 |
| 14. Congenital Malformations.... | 174 | 1.17 | 128 | 1.03 | 98 | 1.24 |
| 15. Certain Diseases of Early Infancy | — | — | — | — | — | — |
| 16. Symptoms, Senility, and Ill-defined Conditions | 365 | 2.45 | 92 | 0.74 | 25 | 0.32 |
| 17. Accidents, Poisoning, and Violence | 274 | 1.84 | 215 | 1.72 | 160 | 2.02 |
| Total | 14,882 | 100.01 | 12,463 | 100.00 | 7,905 | 100.00 |

¹ Based on Department of National Health and Welfare, *Allowances for the Permanently and Totally Disabled - Medical Statistics - April 1, 1957 to March 31, 1960*, Ottawa, 1961, and *Report on the Administration of Allowances for Blind Persons in Canada, Fiscal Year ended March 31, 1962*, Ottawa, 1962.

Accounting for an increasing proportion are: neoplasms; mental, psychoneurotic, and personality disorders; diseases of the nervous system and sense organs.¹

¹ This group does not include blindness, except for a few isolated cases.

Mental and related disorders were the leading cause groups in all three years, followed in the last year by the increasing proportion of diseases of the nervous system and sense organs, and a decreasing proportion of diseases of the circulatory system.

The great importance of psychiatric disorders and diseases of the nervous system and sense organs (including blindness) is borne out also by statistics of registered disabilities of adults in British Columbia.¹ The same source indicates the following as the main causes of disability among the registered live cases under the age of 21:

| <u>Cause</u> | <u>Per Cent of Total</u> |
|-------------------------------|--------------------------|
| Mental retardation | 18 |
| Strabismus | 9 |
| Congenital heart disease | 6 |
| Cerebral palsy | 5 |
| Impaired hearing and deafness | 5 |
| Non -organic speech defects | 4 |
| Clubfoot | 4 |

Of the 308 admissions to the Ontario Crippled Children's Centre in 1963, 105 were cases of cerebral palsy.² Estimates of the incidence of cerebral palsy among school children in England and Wales centred around 1.5 to 2.0 per thousand.³

A study of the types of congenital malformations found among newborn children in British Columbia⁴ disclosed among the most frequent causes cleft palate and harelip, malformations of the circulatory system, clubfoot, spina bifida and meningocele. All these handicaps require, to a varying degree, medical and institutional care, often including a wide range of rehabilitation services. They also represent the demand for compensating devices such as prosthetic appliances of an increasing variety and complexity.

Inadequate eyesight which can be compensated by the use of spectacles is usually not counted a disease or handicapping condition, yet they are no doubt health defects whose rectification does fall under the provision of health services. Following are some approximate estimates of the extent of the problems in this field based on the frequency of these disorders.

In 1961 the number of blind persons registered with the Canadian National Institute for the Blind was 24,117.⁵ The Canadian Sickness Survey indicates that all permanent impairments of the eye - minor as well as total - amount to about four times this figure.

¹ This fact stands out though the two series of statistics are not comparable; see Department of Health Services and Hospital Insurance, British Columbia, Registry for Handicapped Children and Adults, Annual Report 1962.

² Ontario Crippled Children's Centre, Annual Reports—1963, mimeographed.

³ "Incidence of Cerebral Palsy", The Medical Officer, December 30, 1950, p. 281.

⁴ Doughty, J. H., Case Finding of Congenital Malformations, in the above quoted report, pp. 37—50.

⁵ Canadian National Institute for the Blind, Annual Report 1961.

Regarding refractive errors only, the Canadian Association of Optometrists estimates¹ that among the general population 41 per cent do not require vision care, 30 per cent are receiving adequate care, 14 per cent have uncorrected problems, 10 per cent are wearing obsolete or improper corrections, and 5 per cent are uncorrectable. Thus, about 54 per cent of the population require vision aid. This overall percentage varies from about 20 per cent among school-age children to about 90 per cent at age 70.² These figures approach fairly closely the results of a survey in England according to which there are about 44 per cent of the general population there wearing glasses.³

According to the same source, about 88 per cent of the 13.2 per cent of the population having eye examinations, require glasses. This would put the number of people needing new glasses or replacements at about 12 per cent of the population annually. The Canadian Sickness Survey⁴ reported only 4 examinations for glasses in every 100 of the population. The Canadian Association of Optometrists estimate that people on the average have their eyes examined every three to four years.⁵

The causes of blindness in Canada were found distributed as follows:⁶

| | Per Cent |
|----------------|----------|
| Infections | 12 |
| Trauma | 5 |
| Poisonings | 2 |
| Neoplasms | 1.5 |
| Other diseases | 16 |
| Prenatal | 32 |
| No report | 5 |
| Unknown | 26 |

The number of persons in Canada with hearing or speech disorders is not known because available figures like those resulting from the Canadian Sickness Survey are difficult to interpret in view of the gradual differences and also because of the failure of many of the impaired to seek diagnosis and treatment. A vague estimate for the United States states that the numbers there of persons afflicted by hearing disorders “range upward from a conservative 3 million, of which 125

¹ Canadian Association of Optometrists, brief submitted to the Royal Commission on Health Services, May 1962, Toronto, pp. 25–27.

² Ibid., Exhibit No. 19; similar percentages of persons with less than adequate visual acuity are reported in Hofstetter, H.W., Optometry, St. Louis; C.V. Mosby Comp. 1948, p. 369.

³ Gray, P. G., “Who Wears Spectacles?” in The Lancet, Sept. 22, 1951, p. 537.

⁴ Department of National Health and Welfare and Dominion Bureau of Statistics, Illness and Health Care in Canada, Canadian Sickness Survey, 1950–1951, Ottawa: Queen’s Printer, 1960, p. 192.

⁵ Canadian Association of Optometrists, op. cit., p. 26.

⁶ MacDonald, A.E., “Causes of Blindness in Canada”, Canadian Medical Association Journal, Feb. 6, 1965, p. 276.

thousand are totally deaf", the extent of speech impairments being even more uncertain.¹ These estimates are roughly in line with the findings of the United States National Health Survey which in 1957 - 1958 produced the following estimates:²

| | <u>Number</u> | <u>Rate per 100,000</u> |
|--------------------------|---------------|-------------------------|
| Deafness, total | 109,000 | 60 |
| Other hearing impairment | 5,714,000 | 3,390 |
| Speech defects | 1,098,000 | 650 |

The congenital malformations, already discussed, keep adding to the reservoir of impairments resulting from disease or injury during life. The habilitation of the former - fully sharing the benefits extended to the thalidomide group³ - and the rehabilitation of the latter require more adequate data on the extent and characteristics of the various impairments: registries, record linkage, and modern data collection generally must be applied systematically in order to produce the needed information.

Spectacular advances have been made in the care for the impaired: to treatment designed to halt or slow the disease process, we have added the stages of medical restoration and social habilitation and rehabilitation. Scientific analysis of the psychological processes in the adaption of the impaired to his new role are receiving increased attention. A recent detailed study at the Rehabilitation Institute of Montreal⁴ into the problems connected with the "body image" of the handicapped developed a technique of dealing with this problem. Besides the actual physical handicap, it is the concept of the body image of the handicapped which presents a major problem in his rehabilitation: "It is impossible to rehabilitate a person unless he is motivated".⁵ This motivation, however, must be supported by the attitude of society and particularly of those, like employers and unions, who can help to gain or regain for the handicapped his place in the social and economic system of the community.

Our ability to help infants of marginal health to survive, and to keep alive men and women with serious impairments and disease for which there is no known cure, has raised many questions. There is little doubt that we can economically afford to provide these patients with services that will bring them as closely as possible, under the particular circumstances, to a normal way of life. In connection with hereditary conditions, the question of eugenics arises: society will have to examine its role and responsibility in the face of the proliferation of certain hereditary impairments where the saving of life means the creation of progeny known to inherit

¹ Masland, R. L., Scott, R. B., "Progress in Research on Communication", Health, Education, and Welfare Indicators, July 1964, p. VI.

² Based on United States Public Health Service, "Impairments by type, sex, and age, United States, July 1957 - June 1958", Health Statistics, Series B-9, Washington: U.S. Department of Health, Education, and Welfare, 1959, p. 8.

³ "Habilitation of Handicapped Children", editorial, Canadian Medical Association Journal, May 11, 1963, p. 992.

⁴ Chevrier, J. M., et al., Diagnostic D'anomalies physiques et psychiques et pronostique de réhabilitation par l'étude conjointe des dessins projectifs de la personne et du self, Montréal: Institut de Réhabilitation de Montréal.

⁵ Prosen, H., "Physical Disability and Motivation", Canadian Medical Association Journal, June 12, 1965, p. 1265.

the handicap of the parents. In the case of severe disability there is the question of whether or not an extension of life really is a benefit to the patient or merely protracts his suffering. In his Republic, Plato describes the dilemma: ¹

"When a carpenter is ill he asks the physician for a rough and ready cure; an emetic or a purge or a cautery or the knife, -- these are his remedies. And if someone prescribes for him a course of dietetics, and tells him that he must swath and swaddle his head, and all that sort of thing, he replies at once that he has no time to be ill, and that he sees no good in a life which is spent in nursing his disease to the neglect of his customary employment; and therefore bidding good-bye to this sort of physician, he resumes his ordinary habits, and either gets well and lives and does his business, or, if his condition fails, he dies and has no more trouble."

Plato, therefore, saw the role of social medicine in his day as restricted to restoring the sick to their normal working capacity:

"And therefore our politic Asclepius may be supposed to have exhibited the power of his art only to persons who, being generally of healthy constitution and habits of life, had a definite ailment; such as these he cured by purges and operations, and bade them live as usual, herein consulting the interests of the State; but bodies which disease had penetrated through and through he would not have attempted to cure by gradual processes of evacuation and infusion: he did not want to lengthen out good-for-nothing lives, or to have weak fathers begetting weaker sons; - if a man was not able to live in the ordinary way he had no business to cure him; for such a cure would have been of no use either to himself, or to the State."

While some of this reasoning still holds, the advances of medical science and modern rehabilitation techniques render possible varying degrees of usefulness for those previously "good-for-nothing" lives. Under these circumstances, the lengthening of life means hope for new cures, arresting of disease processes and means of compensating for disability. Bernard Baruch once said: ²

"There are no such things as incurables, there are only things for which man has not found a cure."

DENTAL HEALTH

There are several reasons why dental health is reviewed separately from the remaining areas of health, disease, and injury. Dental health is very largely cared for by the dental health services, and dental disorders are those normally treated by the dentist. This alone sets them apart, for better or for worse, from the main stream of health care in a way roughly analogous to the separation between the dentist and the medical practitioner, not unlike the traditional and hard to overcome separation of mental disease and services from other health problems and services. Greater integration of dental and medical education may serve to bring dental health care closer to general health care.

¹ Transl. B. Jovett.

² Address to the President's Committee on Employment of the Physically Handicapped, 1954.

There are other reasons. There seems to be an attitude towards dental care as being more elective than general health care. This may be ascribed partly to a lesser understanding of the nature of dental disorder, to the often limited availability of dental services, and to their cost.

The pain from a toothache can, of course, be as bad and excruciating as the pain from any other disease, but it can often be stopped by the extraction of the tooth or teeth. Other treatment may be feasible and obtainable but it too may be painful, and cause discomfort and expense. Once the source of the pain has been removed, the immediate need for treatment subsides, any resulting complications are slow in developing, and the inconvenience of the loss of a tooth or even several teeth is often suffered because of the lack of access to or desire for further treatment. Cost may be a factor too.

Yet, in the words of the Canadian Dental Association, "the unnecessary tragedy of dental diseases is one of Canada's gravest health problems".¹ That dental disease is among the most frequent will be seen from the following statistics. But if it is a tragedy, why is it not seen as such as are other less frequent health problems?

For one thing, the vast majority of dental disorders are not fatal nor are they disabling, except perhaps for a few hours until a dentist can be reached. Dental disease thus does not appear in the tables which rank diseases in terms of mortality or duration of illness and disability. Nor does it usually require the services of a physician, nurse, hospital, or any other care except the dentist's. Remote effects on general health are probably very real but have as yet not been quantified. Hence, the question "what can we say to those people in our society who still regard teeth as expendable, and dental disease as unimportant?"² can only be answered in general terms.

The effects of missing or diseased teeth on the individual's general health are twofold: they impair the chewing (masticatory) efficiency and they constitute a source of infection. Missing teeth, of course, diminish the chewing ability and even with artificial dentures the masticatory efficiency is said to be only one-half of that of people with their natural dentition,³ but this will vary with the extent of the substitution. Alveolar abscesses and oral sepsis generally are potential sources of infection for the whole body.⁴ Both the extraction and the retention of infected teeth may produce bacteremia harmful to the individual.⁵ The increasing attention to the psychological problems of the body image in the case of impairments generally also bears on the facial disfigurement resulting from missing or decayed

¹ Canadian Dental Association, brief submitted to the Royal Commission on Health Services, Ottawa: 1962, p. 9.

² Dunning, J. M., "Dentistry in Public Health", Canadian Journal of Public Health, May 1964, p. 196.

³ Ibid.

⁴ Grainger, R. M., et al., Dental Health and Fluorides, submission to the Ontario Fluoridation Investigating Committee, Toronto, 1959, p. 3.

⁵ Dunning, J. M., op. cit., p. 196.

teeth and it is probably true that “in our civilization personal appearance is very highly rated and a dental cripple must overcome a very serious handicap”.¹

No national statistics exist on dental health in Canada although the Canadian Dental Association has developed the methods necessary to institute a system for recording and statistical analysis of dental disorders at the community, provincial, and national level.² As in the field of health statistics generally, the World Health Organization through its Expert Committee on Dental Health, has laid the ground-work for international comparability of dental health statistics,³ which with but minor modifications is compatible with the Canadian Dental Health Index developed in this country.⁴

Pending the highly desirable wider application of these methods in Canada, we can only draw general conclusions from regional data and statistics resulting from special surveys.

The fact that practically every adult and the majority of children have some dental health problem can be seen from Table 48 which shows the results of several surveys of Toronto residents. It should be noted that the table refers only to caries.

TABLE 48
PER CENT OF PERSONS WITH CARIES AND AVERAGE NUMBER OF CARIES-AFFECTED TEETH PER PERSON, FOR SELECTED AGES, TORONTO, 1955-1959

| Age | Per Cent of Persons with One or More Caries-affected Teeth | | Average Number of Caries-affected Teeth per Person | |
|------------|--|-----------------|--|-----------------|
| | Deciduous Teeth | Permanent Teeth | Deciduous Teeth | Permanent Teeth |
| 1..... | 1 | — | — | — |
| 2..... | 18 | — | 0.5 | — |
| 3..... | 51 | — | 1.7 | — |
| 4..... | 76 | — | 3.1 | — |
| 5..... | 78 | 4 | 4.5 | 0.1 |
| 7..... | 89 | 43 | 5.3 | 1.0 |
| 9..... | 85 | 77 | 4.9 | 2.4 |
| 11..... | 21 | 89 | 0.7 | 3.9 |
| 13..... | 3 | 89 | 0.1 | 5.7 |
| 15..... | 1 | 96 | — | 8.2 |
| 17..... | — | 97 | — | 10.4 |
| 19..... | — | 99 | — | 12.7 |
| 20-24..... | — | 100 | — | 17.0 |
| 25-29..... | — | 100 | — | 19.1 |
| 30-34..... | — | 100 | — | 19.0 |
| 35-39..... | — | 99 | — | 20.6 |
| 40-44..... | — | 100 | — | 21.3 |
| 45-49..... | — | 100 | — | 21.4 |
| 50-54..... | — | 100 | — | 24.5 |

Source: Based on Grainger, R.M., et al., Dental Health and Fluorides, submission to the Ontario Fluoridation Investigating Committee, Toronto, 1959, Tables I and II.

¹ Grainger, R. M., et al., op. cit., p. 2.
² Canadian Dental Association, The Evaluation of Canadian Dental Health, Toronto: The Association, July 1959.
³ World Health Organization, Standardization of Reporting of Dental Diseases and Conditions, Technical Report Series No. 242, Geneva: The Organization, 1962.
⁴ “International Uniformity in Dental Statistics”, editorial, Journal of the Canadian Dental Association, 1962, p. 723.

A dental health survey among children in seven regions of British Columbia in 1958 - 1960 resulted in the following mean numbers of restored, carious, or lost teeth and crowns per child: ¹

| Age | Deciduous Teeth | Permanent Teeth | Deciduous and Permanent Teeth |
|----------------------------|-----------------|-----------------|-------------------------------|
| 5..... | 5.9 | 0.1 | 6.0 |
| 7..... | 7.2 | 2.2 | 9.4 |
| 9..... | 5.9 | 3.5 | 9.4 |
| 11..... | 2.0 | 5.5 | 7.5 |
| 13..... | 0.3 | 9.1 | 9.4 |
| 15..... | — | 12.4 | 12.4 |
| Ages 7–15 combined..... | 3.5 | 6.0 | 9.5 |

A survey in Winnipeg showed that the average school child aged 6 to 11 had 4.2 deciduous and 2.1 permanent teeth decayed, missing or filled. ²

The same surveys also investigated other aspects of dental health among children in the same age group from 7 to 15. Some of the resulting indices for the combined age groups and regions studied are as follows: ³

| <u>Treatment Level</u> | <u>Per Cent</u> |
|--------------------------------------|-----------------|
| No dental defects | 6.3 |
| No caries defects | 16.8 |
| Visited dentist ⁴ | 82.3 |
| One or more lost - | |
| deciduous tooth or crown | 30.1 |
| permanent tooth or crown | 21.7 |
| lower first permanent molar or crown | 15.7 |
| Oral Hygiene | |
| Poor oral hygiene | 43.1 |
| Periodontal Disease | |
| Abnormal gingival conditions | 11.3 |
| Malocclusion | |
| Under orthodontic treatment | 0.9 |
| With space maintainers | 0.4 |
| Abnormal occlusion | 65.4 |

In the United States it is estimated that among the adult population aged 18 - 79, 18 per cent had lost all their natural teeth; the percentage rises with age from

¹ British Columbia Department of Health Services and Hospital Insurance, British Columbia Dental Health Surveys, 1958–1960, Part III, Division of Vital Statistics, Special Report No. 52, Victoria: The Department, 1961, pp. 16 and 17.

² Paynter, K.J., *Concerning the Establishment of a School of Dentistry in Manitoba*. Report to the Government of the Province of Manitoba, August 1956, p. 10.

³ British Columbia Department of Health Services and Hospital Insurance, *op. cit.*, pp. 16 and 17.

⁴ This is the percentage of children who have visited the dentist as evidenced by the presence of at least one filling or extraction.

about one per cent at age 18-24, to about 60 per cent at age 75-79.¹ The average number of a person's permanent teeth that are decayed, missing or indicated for extraction, or filled (DMF Score) is estimated to increase with age as follows:²

| | DMF Score |
|------------------|-----------|
| All groups 18-79 | 20 |
| 18-24 | 14 |
| 25-34 | 17 |
| 35-44 | 19 |
| 45-54 | 21 |
| 55-64 | 25 |
| 65-74 | 27 |
| 75-79 | 29 |

In the same age groups periodontal disease was estimated to be present in from about 70 per cent in age group 18-24, to about 90 per cent in age group 75-79.³ These figures are of a similar order as the Canadian.

The College of Dental Surgeons of Saskatchewan has fittingly summed up the situation:

"Dental disease is rampant across Canada. Tooth decay has been seen in one-year old children and by age 19, 99 per cent of the population has suffered some type of dental disorder. Despite these appalling facts, only a minority of the families make even one visit a year to a dentist."⁴

According to the Canadian Sickness Survey 1950-1951 only about one in seven Canadians visited a dentist during a year and the Canadian Dental Association estimates that about one-third of all Canadians receive some dental care in a year.⁵ Since the Canadian Sickness Survey, the utilization of dentists may have increased but the variations among income groups probably still prevail at least proportionally since, unlike medical and hospital care, the methods of financing dental care have changed but little. The Sickness Survey findings were:⁶

| Income Groups | Dental Visits per 1,000 Population |
|---------------------|---------------------------------------|
| Low income | 163 |
| Medium income | 302 |
| High income (lower) | 416 |
| High income (upper) | 542 |
| All groups | 323 |

¹ United States Public Health Service, "Selected Dental Findings in Adults, by Age, Race, and Sex, United States 1960-1962", *National Center for Health Statistics Series 11, No. 7*, Washington: U.S. Government Printing Office 1965, p. 15.

² Based on *ibid.*, p. 4.

³ *Ibid.*, p. 22.

⁴ College of Dental Surgeons of Saskatchewan, *Dental Health Problems in Saskatchewan*, a submission to the Advisory Planning Committee on Medical Care, January 1961, p. 1.

⁵ Canadian Dental Association, *op. cit.*, p. IV-2.

⁶ Department of National Health and Welfare and Dominion Bureau of Statistics, *op. cit.*, p. 187.

This disparity aggravates the apparent discrepancy among socio-economic groups of dental disorder. A study in Fort Worth concluded that dental deficiency among elementary and junior high school students is significantly related to the socio-economic status of the census tract in which the students reside.¹

In view of the state of dental health in Canada there is an urgent need for a speeding up of the fluoridation programme.² The effectiveness and safety of fluoridation have been studied more thoroughly perhaps than any other similar measure of introducing preventive agents into the food or water supply. All the existing evidence does, of course, not entirely preclude the possibility of some ill side effects being found at some future time. This happens all the time in other fields, as in the instance of radiation from X-rays or suspected ill effects of foods previously recommended as among the most nutritious. At any one time, however, we can only act on the basis of available evidence and the evidence is stronger in the case of fluoridation than in regard to most other additives we ingest, that no ill effects result while a reduction of 60 per cent in the prevalence of tooth decay to children consuming fluoridated water since birth can be expected.³

The most recent study of the effects of fluoridation compares the state of dental health in three Canadian communities: Sarnia with a negligible amount of fluoride in its water supply; Stratford with a naturally fluoridated water supply; and Brantford with a water supply which has been continuously fluoridated since 1945. As an example, here are the mean numbers of decayed, missing, and filled (DMF) permanent teeth per child 16-17 years old in each of the three communities in 1963:

| | Mean DMF Permanent Teeth per Child 16-17 |
|-----------|---|
| Sarnia | 10.44 |
| Stratford | 4.19 |
| Brantford | 4.74 |

The difference between Brantford and Stratford was found not statistically significant, and that between Sarnia and Brantford statistically significant at the three standard error level.⁴ The high rate in Sarnia indicates the harmful effect of the absence of fluoride, whereas the comparison of the lower rates in Stratford and Brantford shows that the effects of artificial fluoridation approach very closely those of natural fluoride content in the water supply. For the application of fluoride to supplement where necessary the natural amount present, several alternatives to the fluoridation of communal water supplies have been suggested, including the possibility of administering fluoride in milk.⁵ However, from the point of view of

¹Talbert, R.H., "Ecological Variations in Dental Health in a Metropolitan Community", *Journal of Health and Human Behaviour*, Summer, 1962, p. 132.

²The progress of which was discussed in connection with the water supply.

³Statement by Mr. John Munro, Parliamentary Secretary to the Minister of Health and Welfare, House of Commons Debates, Ottawa, March 23, 1964, p. 1333.

⁴Brown, H.K., Poplove, N., "The Brantford - Sarnia - Stratford Fluoridation Caries Study: Final Survey, 1963", *Canadian Journal of Public Health*, August 1965, pp. 319-324.

⁵Marier, J. R., et al., "Accumulation of Skeletal Fluoride and Its Implications", *Archives of Environmental Health*, May 1963, pp. 664-671.

administration and particularly also the all-important control of dosage, the communal water supplies would seem to commend themselves although alternative solutions must be worked out for those who have no access to communal water supplies.

SUMMARY

With the successful control of the major infective diseases, including tuberculosis, and the reduction in the mortality from others, this group has lost much of its former significance. To maintain this situation, however, continued adequate public health services must be ensured. Venereal diseases and infectious hepatitis remain unsolved and even growing problems, together with the still not fully understood complex of the virus diseases.

Cancer remains an unsolved problem although statistics indicate the early diagnosis and treatment may be successful in the treatment of cancer of certain sites.

Allergies and diabetes also remain unsolved problems though mortality from diabetes is reduced by the application of drugs.

Some of the anaemias likewise can be controlled and the fatal aspects reduced by continuous treatment.

The trend of psychiatric disorders is difficult to evaluate because of the lack of adequate data on their incidence and prevalence. The large volume of hospitalization demanded by these conditions and the continuing increase in the admission rate are disquieting factors.

Diseases of the nervous system show higher mortality and greater frequency of hospitalization than ten years ago although in recent years the trend appears to be levelling off.

Circulatory diseases, like cancer and diseases of the nervous system, most frequent among the older age groups, continue with high (the highest of the groups shown) mortality and hospitalization rates.

The diseases of the respiratory system display little change over the last decade, but the trend is sensitive to the incidence of epidemic varieties such as influenza.

Diseases of the digestive system also have changed little from their level in 1951.

The diseases of the genito-urinary system and conditions related to maternity share the substantial decline in their mortality with little change in their demand for hospitalization.

Skin diseases as well as rheumatism and arthritis and the other diseases in this group have shown little change.

Congenital malformations and certain diseases of early infancy share a record of declining mortality but the number of cases brought to treatment in hospitals has increased sharply.

Accidents, by and large, remain a problem both in terms of mortality and hospitalization despite the many programmes designed to reduce accidents in the home, on the road, and elsewhere.

In brief, then, we have been successful in controlling the most deadly communicable diseases including tuberculosis. The chronic diseases - cancer, heart disease, psychiatric disorders, diseases of the nervous system and diabetes - have shown little or no improvement and in many instances increases, as have accidents, allergies, arthritis, and the often minor but frequent diseases of the respiratory and digestive systems.

The problems of the handicapped assume new significance with more effective rehabilitation procedures available.

Little is known of the trend of dental disease but its present extent is very considerable.

RELATIVE MAGNITUDE OF HEALTH PROBLEMS

“Whoever has lost a friend, a brother, a son by any disease will feel that its extinction would be a boon to mankind which no figures can express.”

William Farr — Vital Statistics

The feeling will be still stronger on the part of those actually suffering from a particular disease. Thus the demand will arise from patients and those caring for them, be they professional or lay, to do something about certain health hazards. The intensity of the demand will depend on the number of people involved, how articulate they are, how people react to various diseases because of their unpredictable occurrence, their epidemicity, their resistance to existing treatment techniques, their fatality, and other characteristics which are often difficult to quantify, thus rendering it equally difficult to rationalize the planning of control measures. Certain events, such as the thalidomide tragedy or a mine disaster, may capture the imagination of the public and bring pressure to bear on the health agencies to take action. Those immediately affected by a certain health problem will often find it their main task to arouse public opinion to their problem, a method which has often had beneficial consequences, as in the case of thalidomide or polio control, but which also leaves the uncomfortable feeling that other equally or perhaps even more important areas may be neglected and that a more systematic approach to the solution of our health problems should be adopted. There should be some basic framework within which objectives and priorities could be determined. Once the objectives are clear, the degree of their achievement will serve to evaluate the effectiveness of health services.

We always have been accustomed to seeking out what the main health problems were, labelling them as “the captain of death”, “the number one killer”, or “the number one health problem”. In order to establish claims such as these, we need criteria which would permit us to see various health problems in their proper perspective. This would be helpful for a variety of reasons: it would aid in the allocation of funds for services and research, the planning for the provision of personnel and facilities, and finally the evaluation of health services.

The criteria for determining the importance of a disease or group of diseases will be found among their effects or consequences. The consequences

are varied in type and in the number of people involved; they could be classified into personal and impersonal, or social and economic. Among the effects on the individual are pain, inability to perform normal functions, reduced ability to enjoy recreational activities, anxiety, loss of income, and other financial problems related to the payment for health services and maintenance of himself and his dependents.

To the family it may mean sharing in the suffering and the worries of the patient, upsetting of family routine, and the many stresses created by the patient's sickness and his needs for additional care, the sorrow over a premature death, the loss of the breadwinner, and other economic consequences of income loss and health care bills.

To the community sickness among its members may mean the temporary or permanent loss of a member of the labour force and someone participating in community activities generally, it may bring about the need for community health and ancillary services, and it could lead to economic dependency of the patient and his family.

Many of the effects of illness on the person, like pain, distress, discomfort, anxiety, cannot be quantified and there is no means of assessing them in relation to, say, the cost of health services. Nevertheless, these personal repercussions of illness must not be lost sight of; much of the health care is designed solely or primarily to alleviate pain. And it is pain, discomfort, and worry which affect the well-being – defined as health – as much as do the impersonal effects of illness.

Certain other aspects of illness are more amenable to measurement; they are the duration of illness, the fact of disablement and its duration, and the event of death. Even illness, however, and disability are very largely left to subjective judgment, and so is the onset and end of illness.

We are on firmer ground when it comes to measuring the health services received because we can count units of service. Even here, there are differences; for instance, between one doctor call and another, or one day of hospital care and another, but these differences can be accounted for, if required, by increasing refinement of the data as source records become available. Besides, statistics by using aggregates help in many cases to reduce such differences to what may be accepted as valid averages.

An attempt to measure the total impact of a certain health problem must be restricted then to the quantifiable characteristics of illness, but the problem remains of how to add such social effects as disability or premature death to the cost of health services. We still lack the universal unit of measurement for this purpose such as that at the economist's disposal for measuring the entire array of goods and services that come under his purview, and yet the purely economic aspects are only a part of the wide and varied range of phenomena affecting the individual, the family, and the community.

There is another difficulty in comparing health problems for the purpose of establishing objectives and priorities; this difficulty arises out of the need of defining what specific problems we mean and how to delineate them. In a general way, the objective of health services may be stated as maintaining good health and minimizing the consequences of illness, extending life, and reducing or postponing death. The objective of an increase in the life expectancy during a given period of operation of the health services would be a valid over-all objective for the entire health services complex of a country. It has been shown, however, in the discussion of general mortality rates and life expectancy that these are the net result of illness and death from various diseases and injuries. The causes of illness and death must be studied, therefore, in order to determine their respective effect on the over-all health pattern.

In observing the various causes of illness in the previous chapters, various trends have been identified. One criterion for the importance of a particular disease could be the fact that its incidence or mortality has increased recently; the rate of increase too will have a bearing on the evaluation, as will the number of deaths. Any such increase would be a cause for concern but must be viewed against the nature of the disease and its epidemicity. The threshold may be one case of smallpox or perhaps a thousand cases of influenza. Divergent trends in mortality and incidence or hospitalization will have to be interpreted.

Another set of criteria for the importance of various diseases would be their severity as well as their demand on the health services. This will form the basis for the following tables which, however, can only give a very general picture to be further refined as required for specific purposes and as data become available. Epidemicity also will be an important component in the evaluation.

It must be borne in mind that the choice of classification will affect the ranking of the various items: it makes a difference whether we compare, for instance, all mental illness with certain forms of physical illness, all cancers or only certain forms of it; all circulatory disease or heart disease only, or heart disease as distinct from cardiovascular or cardiovascular-renal disease. The choice of classification in a specific case will have to depend on the purpose of the study and will usually be dictated by considerations of common etiology or common care measures. For the general purposes of the present study the general structure of the main diagnostic classes of the International Classification of Diseases is used.

Table 48A is presented as a model rather than a source of complete and definitive information. The basic data were obtained from sources varying greatly in their scope as well as the period covered, leaving some gaps to be filled by rough approximations. Nevertheless, the figures permit us to view disease groups in a broad perspective. The table shows, for each of the major diagnostic classes, its percentage of mortality and duration of illness from all causes as well as of the total volume of the selected health services for which data could be obtained.

TABLE 48 A
THE MAJOR DIAGNOSTIC CLASSES AND THEIR PERCENTAGE SHARE OF TOTAL ILLNESS
AND HEALTH SERVICES, CANADA, ABOUT 1961

| Diagnostic Class | Illness | | | | Health Services | | | | |
|---|---------|---------------------|-------------------|-----------------------|-----------------------------------|---------------|----------------------|---------------|--------------|
| | Deaths | Premature Mortality | Disabling Illness | Non-disabling Illness | Hospital Separations ¹ | Hospital Days | Physicians' Services | Prescriptions | Home Nursing |
| | % | % | % | % | % | % | % | % | % |
| I. All Infective and Parasitic Diseases | 1.2 | 1.8 | 9.5 | 3.0 | 1.5 | 6.1 | 5.4 | 0.5 | 1.8 |
| Tuberculosis | 0.5 | 0.6 | 1.3 | n.a. | 0.4 | 5.1 | 0.3 | n.a. | 1.0 |
| II. All Neoplasms | 17.0 | 13.7 | 2.0 | 1.4 | 4.6 | 4.6 | 5.8 | 0.3 | 7.3 |
| Malignant Neoplasms | 16.8 | 13.7 | 0.9 | n.a. | 2.5 | 3.6 | 5.1 | 0.3 | 7.0 |
| III. Allergic, Endocrine System, Metabolic and Nutritional Diseases | 2.2 | 1.8 | 1.3 | 5.0 | 2.2 | 1.8 | 2.0 | 7.0 | 11.1 |
| IV. Diseases of the Blood and Blood-forming Organs | 0.4 | 0.3 | n.a. | n.a. | 0.4 | 0.3 | 0.9 | 2.8 | 6.8 |
| V. Mental, Psychoneurotic and Personality Disorders | 0.3 | 0.5 | 9.9 | n.a. | 1.3 | 38.9 | 1.7 | 3.7 | 0.7 |
| VI. Diseases of the Nervous System and Sense Organs | 12.1 | 7.4 | 6.3 | 5.6 | 3.8 | 5.0 | 3.9 | 5.3 | 11.0 |
| VII. Diseases of the Circulatory System | 38.8 | 22.0 | 9.1 | 10.6 | 6.4 | 7.9 | 5.2 | 16.2 | 11.9 |
| VIII. Diseases of the Respiratory System | 5.7 | 7.2 | 28.0 | 23.4 | 14.1 | 4.9 | 15.1 | 16.7 | 1.5 |
| IX. Diseases of the Digestive System | 3.7 | 4.3 | 6.8 | 8.6 | 10.9 | 5.7 | 9.6 | 8.2 | 3.8 |
| X. Diseases of the Genito-Urinary System | 2.1 | 1.5 | 3.5 | 5.0 | 7.0 | 3.5 | 8.7 | 4.4 | 1.8 |

| | | | | | | | | | |
|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| XI. Maternity and Complications..... | 0.2 | 0.3 | 2.5 | 0.5 | 18.5 | 5.7 | 11.3 | 3.5 | 9.2 |
| XII. Diseases of the Skin and Cellular Tissue..... | 0.1 | 0.1 | 1.6 | 5.5 | 2.0 | 0.9 | 8.3 | 4.2 | 1.6 |
| XIII. Diseases of the Bones and Organs of Movement..... | 0.3 | 0.3 | 5.7 | 10.0 | 2.7 | 2.9 | 7.2 | 4.6 | 5.5 |
| XIV. Congenital Malformations | 2.0 | 6.5 | n.a. | n.a. | 0.8 | 0.7 | 0.3 | — | 0.2 |
| XV. Certain Diseases of Early Infancy | 5.1 | 17.4 | n.a. | n.a. | 0.4 | 0.3 | 1.3 | 0.2 | 0.1 |
| XVI. Symptoms, Senility, and Ill-defined Conditions | 0.9 | 0.6 | 8.1 | 17.0 | 1.9 | 0.9 | 6.6 | 5.4 | 4.3 |
| XVII. Accidents, Poisoning, and Violence..... | 7.9 | 14.3 | 5.7 | 4.4 | 7.6 | 4.7 | 6.7 | 4.5 | 3.4 |
| XVIII. Supplementary Class | — | — | — | — | 13.9 | 5.2 | — | 12.5 | 18.0 |
| TOTAL | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

¹ Some items revised from original table in Royal Commission on Health Services, Vol. I, pp. 212-213.

Sources:

- Deaths: Table 5 (Appendix C)
- Premature Mortality: Table 6 (Appendix C)
- Disabling and Non-disabling Illness: Table 7 (Appendix C)
- Hospital Separations and Hospital Days: Table 8 (Appendix C)
- Physicians' Services: Table 9 (Appendix C)
- Prescriptions: Table 10 (Appendix C)
- Home Nursing: Table 11 (Appendix C)

Figure 32 shows the same data rearranged to indicate under each heading (mortality, illness, health services) the main causes of each. Thus we find again the circulatory diseases prominent in regard to mortality, and among the main causes of illness as well as the selected types of health services shown. The respiratory diseases are the main cause of disabling and non-disabling illness, and they require the largest share of any disease group of physicians' services and prescriptions. The largest proportion of hospital care goes to mental illness, whose share in illness is again grossly understated.

The next step is an attempt to show for each diagnostic group its share in the total cost of personal health services. This was done by dividing the total estimated cost for each type of service according to the percentages shown in the foregoing table. Table 49 has a further limitation, in addition to those applying to Table 48A; it omits the cost of public health services applicable to certain infectious diseases and other conditions. Nor does it include a number of health services such as those of the optometrist, and it assumes that the cost in all cases is proportional to the volume of the services provided. We know, however, that the per diem cost in mental, tuberculosis, and other chronic hospitals is less than that for acute treatment beds, and also that the number of procedures performed by physicians and certain types of prescriptions is not proportional to their cost. Eventually it should become possible to refine this table accordingly.

Table 49 shows for each of the diagnostic groups the roughly estimated cost of hospital services, physicians' services and prescriptions,¹ as well as the total for these three items and the estimated cost of dental services. These totals are ranked from the highest to the lowest in Table 50. It shows mental illness as accounting for the highest percentage of the cost,² followed by the respiratory diseases, dental services and circulatory diseases; maternity ranks fourth, and it should be noted that newborn care in the hospital is shown in the supplementary class.

The high expenditure for dental services — even though these services are inadequate at the present utilization rate — is noteworthy. These services relate to conditions with no mortality, illness, hospital or nursing care to speak of.

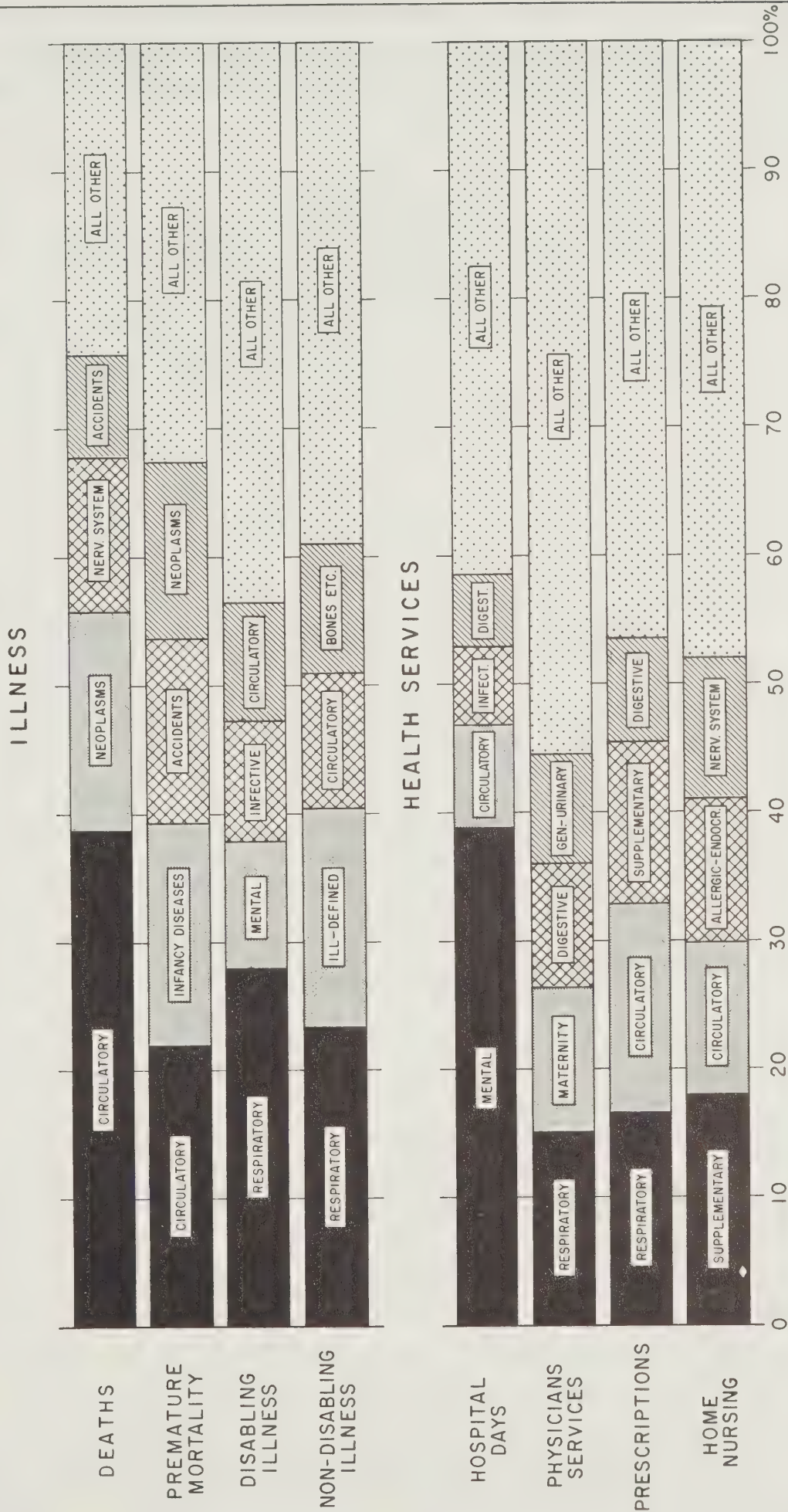
The share of the cost of health services does not, of course, reflect the over-all medical and social importance of a disease or group of diseases. In determining the over-all importance or impact of a disease one must also take into account other effects of illness such as mortality and impaired health. Furthermore, a picture for the nation as a whole obscures the problems created for individuals by comparatively rare diseases or impairments such as the heavy burden imposed by cases of cystic fibrosis, certain crippling impairments, or similar conditions. The group of congenital malformations is an example of conditions accounting for a small, though growing, proportion of health services. Nevertheless,

¹ Number of prescriptions, outside hospital.

² Somewhat overstated as indicated above.

FIGURE — 32

THE MAIN CAUSES OF ILLNESS AND OF THE DEMAND FOR HEALTH SERVICES (AS % OF TOTAL)



Source: Table 50

Canada faces the requirements of an unprecedented expansion in the field of rehabilitation services and prosthetic devices, a long-standing need of children and adults with impairments which has been brought into focus by the deformities resulting from the use of thalidomide.

TABLE 49

ESTIMATED EXPENDITURES ON SELECTED ITEMS
OF PERSONAL HEALTH CARE, BY MAIN DIAGNOSTIC CLASSES,
CANADA, 1961¹

| Diagnostic Class | Hospital Services | Physicians' Services | Pre- scriptions | Total |
|---|----------------------|-------------------------|--------------------|---------|
| | | \$ 000,000 | | |
| I. All Infective and Parasitic Dis- eases..... | 56.3 | 20.7 | .6 | 77.6 |
| Tuberculosis..... | 47.1 | 1.1 | — | 48.2 |
| II. All Neoplasms..... | 42.5 | 22.2 | .3 | 65.0 |
| Malignant Neoplasms..... | 33.3 | 19.5 | | 53.1 |
| III. Allergic, Endocrine System, Meta- bolic, and Nutritional Diseases | 16.6 | 7.7 | 7.8 | 32.1 |
| IV. Diseases of the Blood and Blood- forming Organs..... | 2.8 | 3.5 | 3.1 | 9.4 |
| V. Mental, Psychoneurotic, and Per- sonality Disorders..... | 359.4 | 6.5 | 4.1 | 370.0 |
| VI. Diseases of the Nervous System and Sense Organs..... | 46.2 | 14.9 | 5.9 | 67.0 |
| VII. Diseases of the Circulatory System | 73.0 | 19.9 | 18.0 | 110.9 |
| VIII. Diseases of the Respiratory System | 45.3 | 57.9 | 18.5 | 121.7 |
| IX. Diseases of the Digestive System. | 52.7 | 36.8 | 9.1 | 98.6 |
| X. Diseases of the Genito-Urinary System..... | 32.3 | 33.3 | 4.9 | 70.5 |
| XI. Maternity and Complications | 52.6 | 43.3 | 3.9 | 99.8 |
| XII. Diseases of the Skin and Cellular Tissue..... | 8.3 | 31.8 | 4.7 | 44.8 |
| XIII. Diseases of the Bones and Organs of Movement | 26.8 | 27.6 | 5.1 | 59.5 |
| XIV. Congenital Malformations..... | 6.5 | 1.1 | — | 7.6 |
| XV. Certain Diseases of Early Infancy | 2.8 | 5.0 | .2 | 8.0 |
| XVI. Symptoms, Senility, and Ill-defined Conditions | 8.3 | 25.3 | 6.0 | 39.6 |
| XVII. Accident, Poisoning, and Violence | 43.4 | 25.7 | 5.0 | 74.1 |
| XVIII. Supplementary Class..... | 48.0 | — | 13.9 | 61.9 |
| Sub-total..... | 923.8 | 383.2 | 111.1 | 1,418.1 |
| Dental Services | — | — | — | 118.8 |
| Sub-total..... | — | — | — | 1,536.9 |
| All Other Personal Health Services | — | — | — | 115.0 |
| Total..... | — | — | — | 1,651.9 |

¹ Source for Sub-totals, Dental Services, All Other Personal Health Services, and Total: Department of National Health and Welfare, *Expenditures on Personal Health Care in Canada 1953-1961*, Health Care Series, Memorandum No. 16, Ottawa, 1963.

TABLE 50
THE RANKING OF BROAD DIAGNOSTIC GROUPS IN TERMS OF
THE ESTIMATED COST OF SELECTED PERSONAL HEALTH SERVICES¹
(About 1961)

| Rank No. | Class No. | Diagnostic Group | Estimated Expenditure \$ millions | Per Cent of Total Expenditure |
|----------|-----------|---|-----------------------------------|-------------------------------|
| 1 | V | Mental, Psychoneurotic, and Personality Disorders | 370.0 | 24.1 |
| 2 | VIII | Diseases of the Respiratory System..... | 121.7 | 7.9 |
| 3 | — | Dental Services..... | 118.8 | 7.7 |
| 4 | VII | Diseases of the Circulatory System..... | 110.9 | 7.2 |
| 5 | XI | Maternity and Complications (excl. newborn care).. | 99.8 | 6.5 |
| 6 | IX | Diseases of the Digestive System | 98.6 | 6.4 |
| 7 | I | All Infective and Parasitic Diseases..... | 77.6 | 5.0 |
| 8 | XVII | Accidents, Poisoning, and Violence | 74.1 | 4.8 |
| 9 | X | Diseases of the Genito-Urinary System..... | 70.5 | 4.6 |
| 10 | VI | Diseases of the Nervous System and Sense Organs.. | 67.0 | 4.3 |
| 11 | II | All Neoplasms..... | 65.0 | 4.2 |
| 12 | XVIII | Supplementary Class..... | 61.9 | 4.0 |
| 13 | XIII | Diseases of the Bones and Organs of Movement. ... | 59.5 | 3.9 |
| 14 | — | Malignant Neoplasms | 53.1 ² | 3.5 ² |
| 15 | — | Tuberculosis | 48.2 ³ | 3.1 ³ |
| 16 | XII | Diseases of the Skin and Cellular Tissue..... | 44.8 | 2.9 |
| 17 | XVI | Symptoms, Senility, and Ill-defined Conditions | 39.6 | 2.8 |
| 18 | III | Allergic, Endocrine System, Metabolic, and Nutritional Diseases | 32.1 | 2.1 |
| 19 | IV | Diseases of the Blood and Blood-forming Organs ... | 9.4 | 0.6 |
| 20 | XV | Certain Diseases of Early Infancy..... | 8.0 | 0.5 |
| 21 | XIV | Congenital Malformations..... | 7.6 | 0.5 |
| | | Total..... | 1,536.9 | 100.0 |

¹ Includes: hospital services, physicians' services, prescriptions, dental services.

² Also included in item 11 — All Neoplasms.

³ Also included in item 7 — All Infective and Parasitic Diseases.

The ranking in terms of the cost of health services leaves completely aside any consideration of the impact of mortality, the extent of disability caused by various diseases, and the duration of illness, i.e., the items on the left half of Table 48A.

Is there any way of combining these measurable social aspects with the economic ones in order to estimate the total impact? In view of the aforementioned lack of a common unit of measurement for such things as death, disability, non-disabling illness, and the cost of health services, any approach to adding “apples and pears” must await a consensus of opinion of social scientists regarding the weights to be attached to the various items in any composite score. The following is presented merely as an example based on very arbitrary assumptions.

Obviously such personal implications of illness and death as pain, anxiety, loss of loved ones must be omitted as such, though in some indirect way they may be reflected in the score to be attached to these occurrences.

Death and disability will be considered as having in common the loss of potentially healthful time. In the case of disability this lost time is identical with the estimated duration of disability. In the case of death it is assumed that every death occurring prematurely, i.e., under the age of 70, before the year 1961 means the loss of one man-year if the person had been alive in 1961 had it not been for a premature death. For those dying prematurely during 1961, it was assumed that half a year was lost in each case. Thus the time losses from disability and from premature death can be added. For non-disabling illness it was assumed, arbitrarily, that one-quarter of the duration would give it an adequate weight for a composite score to be added to the time loss due to death and disability. The total of these three items then would represent a score for these social aspects of illness (death, disability, non-disabling illness). The underlying meaning of this score is man-years of health cost.

The cost aspects of health services, to the extent that they could be estimated, are already combined into one set of scores in Table 50.

Both the time loss and cost score are presented in Table 51, showing for the various disease groups the time loss score in one column, the cost score in the other.

Ranking the diagnostic classes according to their social impact score, as opposed to the costs as shown in Table 50, the following order results, from the worst at the top to the best at the bottom:

| Rank | Diagnostic Group | Per Cent of Total Health Time Lost |
|----------------|--|--|
| 1 | Diseases of the respiratory system | 17.3 |
| 2 | Diseases of the circulatory system | 11.7 |
| 3 | Infective and parasitic diseases | 9.6 |
| 4 | Certain diseases of early infancy | 9.4 |
| 5 | Accidents, poisonings, and violence | 8.8 |
| 6 | Diseases of the digestive system | 8.3 |
| 7 | Neoplasms | 6.1 |
| 8 ¹ | Symptoms, senility, and ill-defined conditions..... | 6.1 |
| 9 | Diseases of the nervous system and sense organs | 5.4 |
| 10 | Diseases of the bones and organs of movement..... | 3.6 |
| 11 | Diseases of the genito-urinary system | 3.2 |
| 12 | Mental, psychoneurotic, and personality disorders | 2.6 |
| 13 | Congenital malformations | 2.4 |
| 14 | Allergic, endocrine system, metabolic, and nutritional diseases | 2.3 |
| 15 | Maternity and complications | 1.5 |
| 16 | Diseases of the skin and cellular tissue | 1.5 |
| 17 | Diseases of the blood and blood-forming organs | 0.2 |
| | Total | 100.0 |

¹ Accounting for equal percentages.

Here the mental diseases, which by far lead as the cause of health services and their cost, take twelfth position, largely because of the negligible mortality from these diseases but also because disability and non-disabling illness are grossly understated due to the lack of data. The respiratory and circulatory diseases rank high in both arrays. Infective and parasitic diseases assume a high ranking because of their high share in disability. The diseases of early infancy are prominent because of the cumulative effect of premature mortality in infancy.

A comparison of the foregoing ranking with that in Table 50, as may be expected, demonstrates that the ranking of health problems in terms of their importance varies depending on the criteria determining the importance. An attempt will be made, therefore, to integrate the two series of figures into one. If the two sets of data were to be combined, one would either have to express the time-loss in terms of dollars, or the cost of services in equivalent of time (man-years). One possible, though highly arbitrary, way of doing this is by borrowing the dollar sign but not with any connotation of economic cost or price but merely as a conversion factor to obtain a total social impact score. For many years economists have been computing the monetary values of life and life years lost, emphasizing that such values do not represent the whole intrinsic value of a man or woman but merely their lost or shortened earning capacity. It is, however, not proposed to use these values here but rather some amount which reflects not only the economic aspects of disability or untimely death but which takes into account all the emotional and social dislocation caused by death and disability regardless of the economic role of the patient.¹ We are then not concerned with the presumptive potential earnings of the deceased or disabled. As the death disability part of the score is expressed in man-years, one could possibly assume that any such man-year lost is the equivalent of the per capita personal income which in 1961 was of the order of \$1,500. Multiplied by this factor, the man-years lost can then be added to the cost of services, resulting in one total score.

Using the same principle with exactly the same result but removing any connotation in the end result of dollars and cents, one can approach the matter from the opposite direction and convert cost figures into man-year equivalents by dividing them by \$1,500, the dollar amount of per capita income.

Table 52 shows the combined score obtained by converting the dollar amounts of the cost of services into man-years by means of the per capita income factor as the divisor. The ranking resulting from this composite score is presented in Table 53. The scores shown in these two tables are of a composite nature and, therefore, less obvious and more difficult to interpret. The comments made at the various stages of arriving at these estimates must be borne in mind. They will clearly establish the limitations arising from the lack of data as well as from the arbitrary assumptions that had to be made. Some of the rankings shown in Table 53 may well be changed when more complete data become available, such as on the prevalence of mental disorders.

¹ The purely economic aspects of life and health will be briefly reviewed in Chapter 7; they are more fully discussed in the several economic studies undertaken for the Royal Commission on Health Services.

TABLE 51

ESTIMATED HEALTH TIME LOST AND COST OF SERVICES, BY DIAGNOSTIC CLASS,
CANADA, 1961

| Diagnostic Class | Health Time Lost Man-Years ¹ | | Cost of Services | |
|--|--|----------|------------------|----------|
| | \$ | Per Cent | \$ ² | Per Cent |
| 1. Infective and parasitic diseases..... | 284,000 | 9.6 | 77,600,000 | 5.0 |
| 2. Neoplasms | 181,000 | 6.1 | 65,000,000 | 4.2 |
| 3. Allergic, endocrine system, metabolic, and nutritional diseases..... | 69,000 | 2.3 | 32,100,000 | 2.1 |
| 4. Diseases of the blood and blood-form- ing organs..... | 5,000 | 0.2 | 9,400,000 | 0.6 |
| 5. Mental, psychoneurotic and personality disorders..... | 76,000 | 2.6 | 370,000,000 | 24.1 |
| 6. Diseases of the nervous system and sense organs..... | 160,000 | 5.4 | 67,000,000 | 4.3 |
| 7. Diseases of the circulatory system... | 344,000 | 11.7 | 110,900,000 | 7.2 |
| 8. Diseases of the respiratory system... | 506,000 | 17.3 | 121,700,000 | 7.9 |
| 9. Diseases of the digestive system.... | 246,000 | 8.3 | 98,600,000 | 6.4 |
| 10. Diseases of the genito-urinary system | 93,000 | 3.2 | 70,500,000 | 4.6 |
| 11. Maternity and complications | 45,000 | 1.5 | 99,800,000 | 6.5 |
| 12. Diseases of the skin and cellular tissue | 45,000 | 1.5 | 44,800,000 | 2.9 |
| 13. Diseases of the bones and organs of movement | 105,000 | 3.6 | 59,500,000 | 3.9 |
| 14. Congenital malformations..... | 72,000 | 2.4 | 7,600,000 | 0.5 |
| 15. Certain diseases of early infancy.... | 278,000 | 9.4 | 8,000,000 | 0.5 |
| 16. Symptoms, senility and ill-defined conditions..... | 180,000 | 6.1 | 39,600,000 | 2.8 |
| 17. Accidents, poisoning, and violence | 260,000 | 8.8 | 74,100,000 | 4.8 |
| — Dental services | — | — | 118,800,000 | 7.7 |
| — Supplementary class | — | — | 61,900,000 | 4.0 |
| Total | 2,949,000 | 100.0 | 1,536,900,000 | 100.0 |

¹ Table 4 (Appendix C)

² Table 49.

Above all, it must be remembered that this is at best a general purpose order of ranking or priorities, but certainly not an all purpose ranking. For many purposes of establishing objectives and priorities more specific items will have to be considered and different criteria used. The choice of the per capita income figure for bridging the gap between the social and health aspects on the one side and the economics on the other is, of course, very arbitrary. There is no doubt that the rather primitive methods used here can be refined and improved. The merits of the general approach, which attempts to take into consideration a wide variety of measurable factors, is that it takes into account aspects which are often overlooked if diseases are considered only in terms of numbers of deaths or cases, the number of hospital days they require, or the cost of services they generate. Thus, the scores presented here do reflect, for instance, the impact of such minor but frequent diseases as the common cold, influenza, and some of the infectious diseases of childhood which seem to have been more or less accepted as a nuisance or

a necessary evil rather than an important health problem.¹ Basically, however, apart from the shaky basis of some of the estimates, the validity of this evaluation of various causes of illness depends largely on whether it is a fair assumption to say that about the year 1961, \$1,500 worth of health services were roughly the social value equivalent of one year's loss of health due to death or disability as an over-all average for all age groups of the population.

TABLE 52
GENERAL IMPACT SCORE OF DIAGNOSTIC CLASSES

| Diagnostic Class | Score | | |
|--|-------------------------------|-------------------------------|-------|
| | Health Time Lost ¹ | Cost of Services ² | Total |
| 1. Infective and parasitic diseases | 284 | 52 | 336 |
| 2. Neoplasms..... | 181 | 43 | 224 |
| 3. Allergic, endocrine system, metabolic, and nutritional diseases | 69 | 21 | 90 |
| 4. Diseases of the blood and blood-forming organs.... | 5 | 6 | 11 |
| 5. Mental, psychoneurotic, and personality disorders.. | 76 | 247 | 323 |
| 6. Diseases of the nervous system and sense organs.. | 160 | 45 | 205 |
| 7. Diseases of the circulatory system..... | 344 | 74 | 418 |
| 8. Diseases of the respiratory system..... | 506 | 81 | 587 |
| 9. Diseases of the digestive system | 246 | 66 | 312 |
| 10. Diseases of the genito-urinary system..... | 93 | 47 | 140 |
| 11. Maternity and complications..... | 45 | 67 | 112 |
| 12. Diseases of the skin and cellular tissue | 45 | 30 | 75 |
| 13. Diseases of the bones and organs of movement..... | 105 | 40 | 145 |
| 14. Congenital malformations | 72 | 5 | 77 |
| 15. Certain diseases of early infancy..... | 278 | 5 | 283 |
| 16. Symptoms, senility, and ill-defined conditions | 180 | 26 | 206 |
| 17. Accidents, poisoning, and violence | 260 | 49 | 309 |
| — Dental services..... | — | 79 | 79 |
| — Supplementary class..... | — | 41 | 41 |
| Total..... | 2,949 | 1,024 | 3,973 |

¹ Estimates in Table 51 divided by 1,000.
² Cost estimates in Table 51 divided by (1,500 x 1,000).

No matter which indicator is adopted for an over-all appraisal of the health status, the proven warning signs of rising mortality (as in the case of some neoplasms and certain accidents), of the lowering of the mean age at death (as in the case of accidents), and of increasing incidence (as in the case of venereal disease) must not be overlooked. Also, the organization of health services must be elastic enough to be able to accommodate within a plan of general priorities the

¹ The role of respiratory diseases, as of other diseases, as causes of death could be more fully assessed if mortality statistics showed not only the underlying cause but also contributory causes. In regard to respiratory diseases, for instance, a study by the Metropolitan Life Insurance Company found chronic respiratory disease as the underlying cause of death in 2,280 cases, but also present as contributory cause in 1,172 other deaths ("Reported Frequency of Chronic Respiratory Diseases as Causes of Death; General Findings", Statistical Bulletin, July 1965, p. 3).

application of new scientific knowledge applicable to any health problem. Medical research will always have to proceed on a broad front; while the allocation of funds, personnel, and facilities can encourage research in certain areas of priority, there is no guarantee that this particular line of research will succeed though results may meanwhile be obtained in other areas. Furthermore, objectives and priorities must be continuously reviewed, and where necessary, revised; again, they must be elastic enough to be adjustable to situations arising, for instance, from epidemic outbreaks.

TABLE 53
RANKING OF DIAGNOSTIC CLASSES IN TERMS OF THEIR GENERAL IMPACT

| Rank | Diagnostic Class | Score | Per Cent |
|------|---|-------|----------|
| 1 | Diseases of the respiratory system..... | 587 | 14.8 |
| 2 | Diseases of the circulatory system..... | 418 | 10.5 |
| 3 | Infective and parasitic diseases..... | 336 | 8.5 |
| 4 | Mental, psychoneurotic, and personality disorders..... | 323 | 8.1 |
| 5 | Diseases of the digestive system..... | 312 | 7.9 |
| 6 | Accidents, poisoning, and violence | 309 | 7.8 |
| 7 | Certain diseases of early infancy..... | 283 | 7.1 |
| 8 | Neoplasms..... | 224 | 5.6 |
| 9 | Symptoms, senility, and ill-defined conditions..... | 206 | 5.2 |
| 10 | Diseases of the nervous system and sense organs..... | 205 | 5.2 |
| 11 | Diseases of the bones and organs of movement | 145 | 3.6 |
| 12 | Diseases of the genito-urinary system | 140 | 3.5 |
| 13 | Maternity and complications..... | 112 | 2.8 |
| 14 | Allergic, endocrine system, metabolic and nutritional diseases..... | 90 | 2.3 |
| 15 | Dental services..... | 79 | 2.0 |
| 16 | Congenital malformations..... | 77 | 1.9 |
| 17 | Diseases of the skin and cellular tissue..... | 75 | 1.9 |
| 18 | Supplementary class | 41 | 1.0 |
| 19 | Diseases of the blood and blood-forming organs..... | 11 | 0.3 |
| | Total | 3,973 | 100.0 |

Source: Table 52.

The further improvement and sharpening of health indicators to determine objectives and priorities will depend very largely on the availability of more adequate data which are an essential prerequisite to the application of new statistical methods.¹ What a United Nations report stated with regard to social planning generally, applies to planning in the health field: “ . . . the more comprehensive and accurate are the available statistical services, whether or not they form a direct part of the planning authority’s machinery, the more effective and realistic will be the plans produced”.²

¹ See Chiang, C.L., *An Index of Health: Mathematical Models*, National Center for Health Statistics, Series 2, Number 5, Washington: Public Health Service, 1965; and Pan American Health Organization, *Health Planning – Problems of Concepts and Methods*, Scientific Publication No. 111, Washington: The Organization, 1965.

² United Nations, *Problems of Social Development Planning, Development Programming Techniques* Series No. 4, New York 1964, p. 31.

The setting of actual priorities is not merely a matter of determining objectives. Where there are known means of control or eradication, prevention or treatment, we can establish that a certain investment will yield certain returns. This applies for instance, in the case of many of the infective and parasitic diseases in tropical countries: we can estimate the cost of malaria eradication or a polio vaccination programme, and we can predict the resulting reduction in mortality and incidence of the disease. The situation is different in regard to those aspects of chronic and degenerative diseases where we lack specific methods of prevention and successful treatment. We can assess the effectiveness of a screening programme on the incidence or mortality from cervical cancer and since we know the cost of such a programme we can evaluate one against the other. For other types of cancer and other diseases the main channel for investment may lie not in the area of specific services with known effects, but in research where a definite relationship between investment and expected result does not exist: an additional million dollar grant for cancer research may increase the likelihood of prevention or cure being found but there is no guarantee of success. Thus, the allocation of funds, particularly for research, will be guided not only by the weight of the objective but also by the existence of channels which may lead to eventual results.

To classify health problems in terms of diagnostic entities is only one possible approach to their evaluation. In the case of accidents, for instance, preventive measures are based on the study of the external circumstances under which the accident occurred rather than on the nature of the resulting injuries. Many of the health problems discussed in this and the previous chapter are characteristic of and vary with certain groups of the population, such as the various age groups, and it is useful therefore also to explore this axis of classification of health problems. This will be done briefly in the following chapter.

CERTAIN POPULATION GROUPS AND THEIR HEALTH

“And one man in his time
plays many parts - ”

Shakespeare - As You Like It

Throughout this study the emphasis has been on the dynamics of health and its close interrelationship with man’s varying demographic and social characteristics. To identify and evaluate these relationships is the objective of social medicine which aims at appraising a man’s health problems and needs in the light of his social environment. There is an infinite variety of situations which should be judged, therefore, by the social physician in the light of the individual case. If, nevertheless, certain groups are being singled out here for a brief outline of their characteristic health problems, it is because these groups have common health problems and can be identified fairly readily.

The groups selected here are the broad age groups, the sexes, and the geographically and socially well-defined groups of Canada’s northern population. There are, of course, many other groups which could be studied such as the poor who have very significant problems of health and health care, but who are widely scattered throughout the country. The most pressing problem of this group is the remedy of the causes of their poverty. Where ill health, the resulting burden of expenses, and the loss or reduction of earning capacity are among the causes of poverty, financial relief aimed at removal of the cost of care and income maintenance measures will play a part in solving the problem; the following chapter will discuss some of these implications. With the exception of some groups of indigenous Canadians, however, the poor form a very heterogeneous and widely dispersed group whose problems, furthermore, are now the objective of the recently declared war on poverty.

Another way of grouping health problems is the often used distinction between acute and chronic conditions. This is not a clear-cut division and one which is largely covered by the review of diagnostic groups in the foregoing chapters and, to some extent, by examining the health problems of certain age groups.

The discussion in this chapter then will concentrate on broad age groups, differentials between the sexes, and health problems of the entire population and certain indigenous groups, particularly of the North.

THE HEALTH AGES OF MAN

Differences in the health and illness patterns among age groups have an essentially different connotation from those among other groupings of people, be it by sex, occupation, region or any other characteristic. Whereas an individual remains in a group of the latter type throughout his life or at least for prolonged and indefinite periods, the age groups represent successive stages in the life of every individual so that a composite picture of the age groups from birth to death actually represents the longitudinal lifetime experience of Canadians. We are thus reminded that in regard to health too in many respects the child is father of the man, just as the middle-aged is father of the aged.

As with the grouping of diseases, a grouping of ages must be adjusted to the needs of a particular investigation. The broad groups selected here will obscure certain more specific problems of narrower groups. The study of infant health, for instance, requires the breakdown of the first year of life into the newborn and perinatal period generally, and still finer divisions within these periods. Similarly, health problems vary between the pre-school, school, and adolescent ages, as well as within the middle-age group, and the older ages over 65. Nevertheless, the groups selected here may serve to provide a general picture, the grouping being dictated partly by the availability of some of the data. The groups and their general social characteristics are:

| | |
|------------------|---|
| Under 15 years: | childhood and dependency; |
| Age 15 - 24: | adolescence, higher education, labour force recruitment, family founding; |
| Age 25 - 44: | work career, peak of family responsibility; |
| Age 45 - 64: | conclusion of working age, preparation for retirement, onset of diseases characteristic of older age; |
| Age 65 and over: | retirement. |

The percentage distribution of these groups was, according to the 1961 Census, the year to which most of the statistics shown apply, as follows:

| | |
|------------------|----------------|
| Under 15 years: | 34.0 per cent |
| Age 15 - 24: | 14.3 per cent |
| Age 25 - 44: | 26.7 per cent |
| Age 45 - 64: | 17.4 per cent |
| Age 65 and over: | 7.6 per cent |
| Total | 100.0 per cent |

TABLE 54
SELECTED AGE GROUPS AND THEIR ESTIMATED PERCENTAGE SHARE
OF TOTAL ILLNESS AND HEALTH SERVICES,
CANADA, ABOUT 1961

| Age Group | Population | Illness | | | | Health Services | | | |
|---------------|------------|---------|---------------------|-------------------|-----------------------|-----------------|----------------------|---------------|--------------|
| | | Deaths | Premature Mortality | Disabling Illness | Non-disabling Illness | Hospital Days | Physicians' Services | Prescriptions | Home Nursing |
| | % | % | % | % | % | % | % | % | % |
| - 15..... | 34 | 11 | 40 | 27 | 20 | 12 | 17 | 16 | 12 |
| 15 - 24 | 14 | 2 | 5 | 11 | 10 | 11 | 8 | 3 | 5 |
| 25 - 44..... | 27 | 6 | 11 | 20 | 29 | 25 | 34 | 35 | 12 |
| 45 - 64..... | 17 | 22 | 21 | 24 | 26 | 27 | 24 | 33 | 14 |
| 65+..... | 8 | 59 | 23 | 18 | 15 | 25 | 17 | 13 | 57 |
| Total | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |

Sources: The estimated percentage distributions shown in the table are derived from the following sources:
deaths - Dominion Bureau of Statistics, Vital Statistics 1961, Ottawa: Queen's Printer 1963;
premature mortality - tabulations specially prepared and made available by the Vital Statistics Section of the Dominion Bureau of Statistics;
disabling and non-disabling illness - Department of National Health and Welfare and Dominion Bureau of Statistics, Illness and Health Care in Canada, Ottawa: Queen's Printer 1960 (age-adjusted to 1961 population);
hospital days - Dominion Bureau of Statistics, Hospital Statistics, Mental Health Statistics, Tuberculosis Statistics 1961, Ottawa: Queen's Printer, various years; and Department of National Health and Welfare, Hospital Care in Canada, Trends and Development, unpublished manuscript;
physicians' services - data from sample of 500 families made available by Physicians' Services Inc.; and Medical Services (Alberta) Inc., Service Patterns of Physicians, mimeographed;
prescriptions - Department of National Health and Welfare, Provision, Distribution, and Cost of Drugs in Canada, study prepared for the Royal Commission on Health Services, Ottawa: Queen's Printer 1965 (experience of Saskatchewan public assistance beneficiaries and of Prescription Services Inc., age-adjusted to general population);
home nursing - Dominion Bureau of Statistics, Home Nursing Services, Ottawa: Queen's Printer 1962.

Thus, about one-third of the population are children, almost 60 per cent are in the working-age group, and about one in thirteen is in the old-age group.

The statistical device of classifying age groups must not be allowed to detract from the fact that individuals will differ in their physical and mental status, and hence in their health problems, from the norm of the group. It is also important to bear in mind that the connotations of childhood, maturity, and old age are undergoing changes. It is said, for instance, that children mature earlier physically and mentally while, on the other hand, the school leaving age is postponed. Earlier marriage changes the patterns of family formation, and our stereotype concepts of old age are being re-appraised.

Reference is made to the studies of children's health in connection with the 1960 Canadian Conference on Children, and that of the aged in connection with the Special Committee of the Senate on Aging, whose report is in preparation, and the Canadian Conference on Aging to be held in January 1966.

Table 54 shows, for selected aspects, the estimated share of illness and health care attributable to the various age groups; the former is graphically presented in Figure 33.

While the incidence, prevalence, and mortality rates from various diseases display certain patterns, generally increasing with age, the demand for services is determined by the size of the respective age groups. Thus, the share of each age group in the sum total of the manifestations of illness and the resulting demand for services reflects both the age-specific incidence and the number of people in each group. The fact that the over 65, for instance, account for only 8 per cent of the total population, is the reason for percentages of health services being lower than one might expect from the high incidence of illness at these ages. The high incidence, on the other hand, accounts for the fact that the age group does account for portions of health care substantially beyond its numerical size.

The age-specific mortality pattern is very similar in most countries though the levels of mortality and the steepness of the curve, according to which mortality first declines and then rises with age, vary considerably: "The typical variation of mortality with advance in age during the life span may be represented by a 'U' shaped curve, which starts high at birth, declines rapidly towards a minimum around the twelfth year of age, and then increases slowly through adolescence and maturity until it reaches the second catastrophic maximum at the terminal period of senescence."¹ It is noteworthy that the lowest mortality level is not reached until about age 12, and that the age-specific mortality among children aged 1 to 4 is at about the level reached again in the twenties when the rate has begun to climb. The age-specific death rates (per 1,000 population) for these early ages were as follows in 1963, for both sexes:²

¹ United Nations, *Age and Sex Patterns of Mortality*, Population Studies, No. 22, New York, 1955, p. 1.

² Dominion Bureau of Statistics, *Vital Statistics 1963*, Ottawa: Queen's Printer 1965, pp. 100-101.

| Age | Rate |
|---------|------|
| Under 1 | 26.3 |
| 1 - 4 | 1.1 |
| 5 - 9 | 0.6 |
| 10 - 14 | 0.4 |
| 15 - 19 | 0.8 |
| 20 - 24 | 1.2 |
| 25 - 29 | 1.1 |

The slight rise and subsequent decline between the ages of 20 and 29 can be traced to the mortality among men in this age group; a pattern that has prevailed since the 1940's. Accidental deaths account for a large part of this anomaly in the curve but other causes also show a similar pattern. The loss of life years is greatest in the lowest age group where the fewer deaths mean a disproportionate loss of potential lifetime. The illness pattern for both disabling and non-disabling illness reflects the demand for maternity care in the middle-age groups, and the higher illness rates among the older people.

The estimates of the share of each age group in the demand for selected health services must be taken as rough approximations only, to be revised and refined as more and better data become available. They show the demand for services to be higher among children than the next higher age group which would account for a smaller percentage were it not for maternity cases. The latter affect substantially the percentages accounted for by the age groups 15 - 24, and 25 - 44. The oldest group, age 65 and over, uses hospital services in a proportion about three times its numerical size in the population, physicians' and prescription services in about twice this proportion. Despite the relatively high demand on home nursing among women in the child-bearing age groups, almost 60 per cent of all home nursing visits went to the aged, a reflection of the fact that nursing in the home is a service particularly suited to the health care needs of the aged.

Assuming, as in the preparation of Table 49, that the cost of services generated by each age group is proportional to the estimated volume of service, we obtain the distribution shown in Table 55:

TABLE 55
ESTIMATED COST OF SELECTED ITEMS OF
HEALTH CARE FOR CERTAIN AGE GROUPS, CANADA, 1961

| Age Group | Hospital Services | Physicians' Services | Prescriptions | Total | Per Cent |
|---------------|-------------------|----------------------|---------------|-----------|----------|
| | \$000,000 | \$000,000 | \$000,000 | \$000,000 | |
| - 15 | 110.8 | 65.1 | 17.8 | 193.7 | 13.7 |
| 15 - 24 | 101.6 | 30.7 | 3.3 | 135.6 | 9.6 |
| 25 - 44 | 231.0 | 130.3 | 38.9 | 400.2 | 28.2 |
| 45 - 64 | 249.4 | 92.0 | 36.7 | 378.1 | 26.6 |
| 65 + | 231.0 | 65.1 | 14.4 | 310.5 | 21.9 |
| Total | 923.8 | 383.2 | 111.1 | 1,418.1 | 100.0 |

Source for totals: Department of National Health and Welfare, Expenditures on Personal Health Care in Canada 1953-1961 Health Care Series, Memorandum No. 16, Ottawa: The Department, 1963.

Hospital services, physicians' services, and prescribed drugs - the services shown in Table 55 - accounted for 86 per cent of the total estimated expenditure on personal health care in Canada in 1961. To the extent that the percentages shown in Table 55 are representative of the total expenditure, it follows that health services to children make up about one-seventh of the total, to people in the working ages about two-thirds, and to the over 65 one-fifth to one-fourth. The preventive services provided by public health authorities are not included in these estimates, nor is dental care and other services not specified in the table.

Certain variations among the age groups in the leading causes of morbidity and mortality have already been pointed out in Chapter 4. It is unfortunate that the various sources of statistical data use different classifications of age groups as well as of causes so that an integrated picture could not be presented without complete rearrangement of the data.¹

Broadly speaking, the leading causes of death in the first year of life are immaturity, congenital malformations, respiratory infections, asphyxia and birth injury. In the pre-school ages accidents assume the leading role, followed by respiratory and digestive infections as well as cancer. Accidents remain the most frequent cause² up to age 44. After that, cardiovascular diseases and cancer - in that order - appear as the leading causes of death with respiratory infections continuing among the five leading causes.³

For general illness data we have to turn to the Canadian Sickness Survey 1950-51 which, despite its limitations, is the only available source.⁴ Its main limitations, apart from being fifteen years old, are the omission of psychiatric disorders and the large number of symptoms and ill-defined conditions reported. The latter appear among the five most frequent cause groups in all age categories. The diseases of the respiratory system are the most frequent in all age groups. At ages under 15, they are followed by the diseases of the digestive system and accidents. In the groups 15 - 24 and 25 - 44, the diseases of the digestive system and accidents remain among the five most frequent cause groups, followed in the latter age group by conditions related to maternity. At ages 45 - 64, diseases of the bones and organs of movement appear among the leading ones, followed by accidents. In the 65 and over group, the diseases of the circulatory system and of the nervous system and sense organs enter into the ranks of the five most frequent cause groups.

This picture is not unlike the one obtained half a century ago in the United States from sickness surveys undertaken by the Metropolitan Life Insurance

¹ See for instance, the classifications used in the report on the Canadian Sickness Survey 1950-51, the reports on hospital morbidity, and the leading causes of deaths as presented in the vital statistics reports.

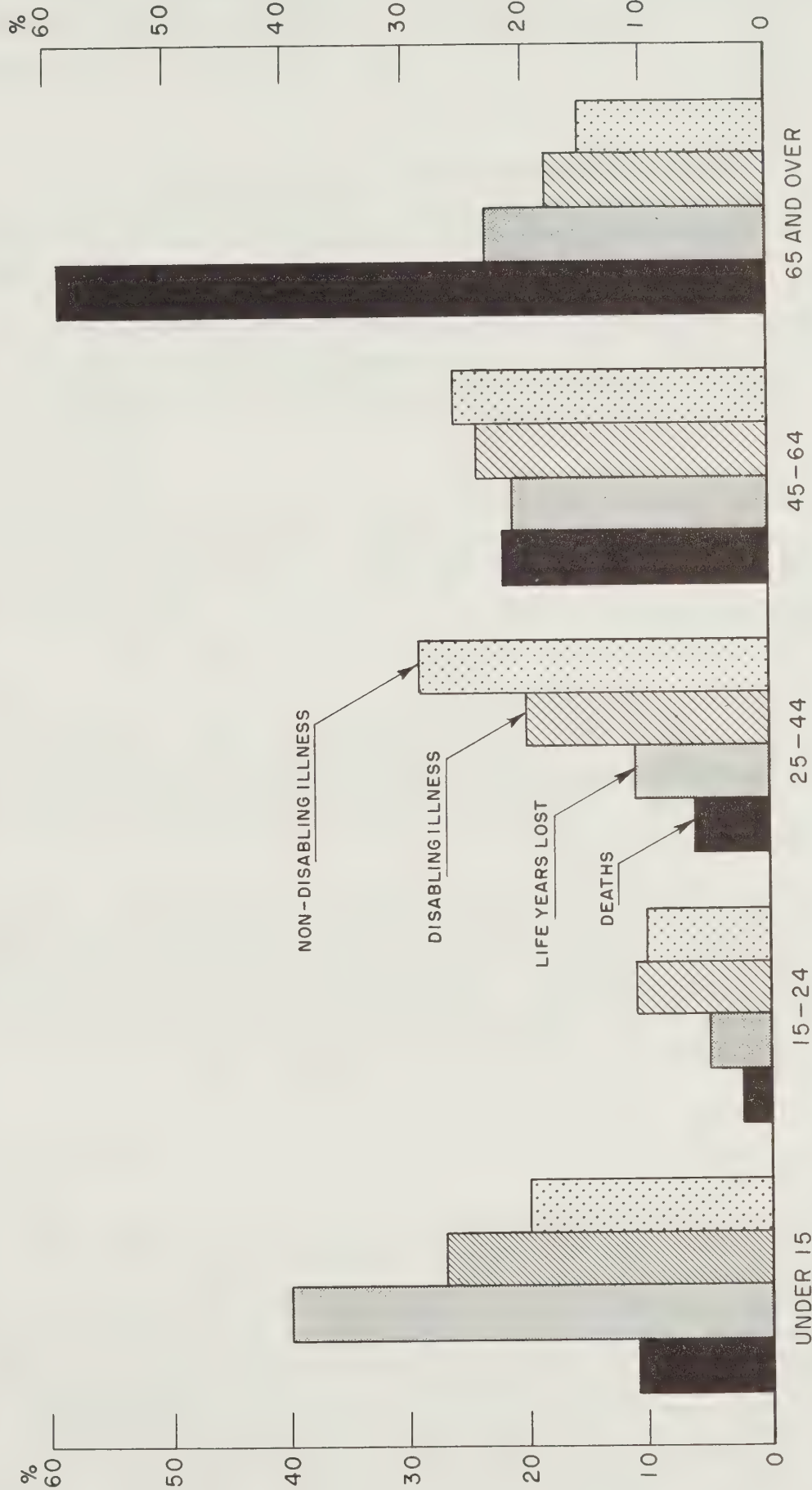
² Always in terms of the particular classification used.

³ Dominion Bureau of Statistics, *Vital Statistics* 1963, Ottawa: Queen's Printer 1965, p. 23.

⁴ Department of National Health and Welfare and Dominion Bureau of Statistics, *op. cit.*, pp. 130-137.

FIGURE — 33

THE SHARE OF SELECTED AGE GROUPS IN THE LOSS OF LIFE AND IN ILLNESS



Source: Foregoing tabulations

Company¹. These surveys which were carried out in seven areas of the United States, and followed a common pattern so that the results could be combined, are significant in that they are among the first attempts to obtain general morbidity data on a wide scale. In regard to causes of sickness in relation to age, the report had this to say:

“The acute infectious diseases, such as measles, scarlet fever, whooping cough and diphtheria, as well as pneumonia, were found preponderant in the age period below 15 years. From 15 to 34, tuberculosis, malaria, pellagra and mental alienation showed their greatest prevalence and, among females, conditions connected with childbirth. Cancer, rheumatism and influenza were found most important in the period 35 to 54. External violence was prominent in this age period, and the degenerative diseases began to become important. While all of these were found to a large extent in the preceding group and in the one which follows, it was in this latter, made up of those 55 and over, that cerebral hemorrhage, apoplexy and paralysis were of greatest significance.”²

Diseases like tuberculosis and malaria may be less frequent today or, like malaria, non-existent indigenously in Canada, but the quoted passage still provides a valid description of the health problems at various ages. It also emphasizes that health is a continuum with its various aspects not contained or containable within the chronological limits of arbitrarily drawn age groups.

Tables 54 and 55 indicate the proportion of illness and health care demand accounted for by the different age groups. This, as stated, reflects the numerical size of the age groups as much as the age-specific rates. To show the impact of illness in terms of morbidity and mortality in each age group, Table 56 compares the respective rates.

The table shows for most of the indices a pattern similar to that of the age-specific mortality rates: high in the early years of life, low during adolescence, and then steadily rising until the highest rates are reached in the oldest age group. The table also indicates that illness and disability among the older people are more severe. Illnesses among older people also last longer:

¹ Stecker, M.L., *Some Recent Morbidity Data, a Summary of Seven Community Sickness Surveys Made Among Policyholders of the Metropolitan Life Insurance Company, 1915 to 1917.*

² *Ibid.*, p. 17. The survey report begins with the following still very timely observations: “Mortality rates have been extensively used as a measure of the comparative health standards among different population groups not because they are the best criteria of health, but because they have been the only reliable data available... It has come to be recognized that the death rate cannot be accepted as the final standard of measurement of health. Any community with relatively few deaths may still contain a large number of individuals who are so disabled physically or mentally as to be useless, indeed, even burdensome, to themselves and to the groups of which they are a part. Growing appreciation of the importance of this fact taken in connection with the developing knowledge that most diseases are, within reasonable limits, not only curable but preventable, is causing sanitarians to call increasing attention to the necessity for an accurate knowledge of the incidence of sickness and to the desirability of a periodic morbidity census by which this knowledge may be obtained.”

| Age Group | Average Number of Days per Sickness ¹ | |
|-------------|--|--------------------|
| | Any Sickness | Disabling Sickness |
| Under 15 | 12.5 | 6.7 |
| 15 - 24 | 18.4 | 8.9 |
| 25 - 44 | 25.8 | 9.9 |
| 45 - 64 | 40.7 | 17.8 |
| 65 and over | 61.1 | 29.7 |

And the Canadian Sickness Survey also found more sickness of at least one year's duration among the older people:²

| Age Group | Year-long Sicknesses |
|-------------|-----------------------------|
| | Rate per 100,000 Population |
| Under 15 | 1,400 |
| 15 - 24 | n.a. |
| 25 - 44 | 5,000 |
| 45 - 64 | 9,000 |
| 65 and over | 16,000 |

TABLE 56
SELECTED MORTALITY AND MORBIDITY RATES, BY AGE GROUPS
(all rates per 100,000 population)

| | Age Group | | | | |
|---|-----------|-----------|-----------|-----------|------------|
| | - 15 | 15 - 24 | 25 - 44 | 45 - 64 | 65+ |
| Age-specific death rate..... | 254 | 100 | 172 | 952 | 6,121 |
| Sick on an average day..... | 11,100 | 11,900 | 18,500 | 25,700 | 36,100 |
| With permanent physical disability..... | 1,800 | n.a. | 6,100 | 13,100 | 25,500 |
| Minor and moderate disability..... | n.a. | 1,600 | 3,900 | 7,500 | 10,200 |
| Severe and total disability..... | n.a. | n.a. | 2,300 | 5,600 | 15,300 |
| Days per year of any illness..... | 3,600,000 | 3,200,000 | 5,400,000 | 7,200,000 | 10,500,000 |
| Days per year of disabling illness..... | 1,000,000 | 800,000 | 900,000 | 1,600,000 | 2,900,000 |

Source: Death rates based on Dominion Bureau of Statistics, Vital Statistics 1963, Ottawa: Queen's Printer 1965; other rates based on Department of National Health and Welfare and Dominion Bureau of Statistics, Illness and Health Care in Canada, Canadian Sickness Survey 1950 - 51, Ottawa: Queen's Printer 1960.

¹ Department of National Health and Welfare and Dominion Bureau of Statistics, op. cit., p. 125.

² Ibid.

The drop in the rates from the youngest age group to the next is less pronounced for the morbidity indicators than it is for mortality because morbidity includes conditions related to pregnancy and childbirth which have their greatest impact in the age groups 15 to 44.

The demand for health care by members of the various age groups follows a pattern similar to that of age-specific morbidity and mortality. Table 57 shows selected age-specific health care rates:

TABLE 57
ESTIMATED UTILIZATION OF SELECTED HEALTH SERVICES BY
PEOPLE IN VARIOUS AGE GROUPS
(per 100,000 population)

| Service | Age Group | | | | |
|--|-----------|---------|---------|---------|---------|
| | - 15 | 15 - 24 | 25 - 44 | 45 - 64 | 65+ |
| Physicians' procedures..... | 190,000 | 182,000 | 275,000 | 321,000 | 352,000 |
| Separations (general and allied hospitals)..... | 20,000 | 7,000 | 8,000 | 14,000 | 27,000 |
| Patient days (general and allied hospitals)..... | 133,000 | 58,000 | 81,000 | 213,000 | 657,000 |

Source: Physicians' Procedures — based on data from sample of 500 families made available by Physicians' Services Inc.,
Hospital Separations and Days — based on Dominion Bureau of Statistics, Hospital Morbidity 1960, Ottawa: Queen's Printer 1964, p. 11 (newborn included in age group under 15).

There are other indicators of the greater utilization of health services with increasing age:

| Age | Patient-days per Hospital Separation in General and Allied Hospitals ¹ | Home Nursing Visits per Case ² |
|---------|--|---|
| - 15 | 6.7 | 4.5 |
| 15 - 24 | 8.1 |) |
| | |) 9.3 |
| 25 - 44 | 10.3 |) |
| 45 - 64 | 15.7 | 18.4 |
| 65 + | 23.9 | 26.3 |

The age-specific rates per 100,000 population of first admissions and readmissions to mental institutions, and of patients in these institutions were as follows in 1962:³

¹Dominion Bureau of Statistics, Hospital Morbidity 1960, Ottawa: Queen's Printer 1964, p. 11.
²Dominion Bureau of Statistics, Home Nursing Services 1961, Ottawa: Queen's Printer 1962, p. 48 (refers to medical-surgical visits only, not maternity).
³Dominion Bureau of Statistics, Mental Health Statistics, Vol. I, and Vol. II, Ottawa: Queen's Printer 1964 and 1965.

| | <u>Age Group</u> | | | | | | | | | | | |
|--------------------------|------------------|-----|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | 0-4 | 5-9 | 10-14 | 15-19 | 20-29 | 30-39 | 40-49 | 50-59 | 60-69 | 70-79 | 80-89 | 90+ |
| First admissions | 26 | | 87 | | 221 | 242 | 236 | 220 | 216 | 281 | 562 | 687 |
| Readmissions | 4 | | 18 | | 121 | 196 | 228 | 222 | 179 | 130 | 78 | 18 |
| Patients in institutions | 20 | 118 | 197 | 327 | 370 | 439 | 561 | 734 | 861 | 919 | 1,207 | 1,550 |

The rates per 100,000 population of tuberculous patients in institutions were as follows in 1962:¹

| | <u>Age Group</u> | | | |
|--------|------------------|-------|-------|-------|
| | 15-24 | 25-44 | 45-64 | 65+ |
| Male | 21.9 | 32.5 | 65.8 | 106.2 |
| Female | 22.9 | 24.9 | 26.0 | 38.8 |

Following this comparative review of the health at various age groups, it may be well to look briefly at the situation in each group. Regarding mortality patterns, reference is made to the leading cause tabulations contained in the vital statistics reports for Canada though they differ, as pointed out, from other health statistical series in the age grouping used as well as in the concept of what constitutes “a cause” for the purpose of determining leading causes.²

Under 15 Years

The nearest comparable age groups used in the vital statistics reports comprise the ages from 0 to 19. The leading causes of deaths according to these statistics are:³

| <u>Cause</u> | <u>Under 1 Year</u> | <u>Rate⁴</u> |
|-------------------------------------|---------------------|-------------------------|
| Immaturity | | 504 |
| Congenital malformations | | 444 |
| Influenza, bronchitis, pneumonia | | 354 |
| Post-natal asphyxia and atelectasis | | 294 |
| Injury at birth | | 265 |

¹Dominion Bureau of Statistics, Tuberculous Statistics 1962, Vol. I, Ottawa: Queen’s Printer 1965, p. 110.

²The use of varying classifications to determine leading causes and their ranking leads, of course, to different results and thus can be very misleading. It would be very desirable for the experts, both international and national, to adopt uniform practices in this regard or else not attempt any all-purpose ranking but compare numbers of cases or deaths, or percentages as required for specific purposes.

³Dominion Bureau of Statistics, Vital Statistics 1963, Ottawa: Queen’s Printer 1965, p. 23.

⁴Per 100,000 live births.

| <u>1 - 4 Years</u> | |
|--|-------------------------|
| <u>Cause</u> | <u>Rate¹</u> |
| Accidents | 45 |
| Influenza, bronchitis, pneumonia | 19 |
| Congenital malformations | 12 |
| Cancer | 12 |
| Gastritis, duodenitis, enteritis, colitis | 5 |
| <u>5 - 19 Years</u> | |
| <u>Cause</u> | <u>Rate²</u> |
| Accidents | 33 |
| Cancer | 7 |
| Influenza, bronchitis, pneumonia | 3 |
| Congenital malformations | 2 |
| Cardiovascular disease | 2 |

Such ranking can be deceptive. It must be borne in mind that the shift in the order in which various causes appear from one age group to the next is due to relative changes and not necessarily to changes in the force of a certain cause of death. It will be noted that all rates after the first year of life are substantially lower than those during infancy. For example, if accidents appear as the leading cause at ages 1 - 4 it does not mean that children in this group have more fatal accidents than the under 1. In fact, the accident rate during the first year of life was 119 per 100,000 live births, or two to three times that in the following age group, and yet accidents are not among the leading causes among infants whereas, despite the lower rate, they are the leading cause in the next age group. The low level of mortality among children aged 1 to 19 also means that rank differences are smaller and have less significance because small numbers will be more affected by small numerical changes. In 1962, for example, the year previous to that reviewed here, congenital malformations and the respiratory infections reversed their respective ranking in the 5 - 19 group.

The causes of physical illness in the age group under 15 as found in the Canadian Sickness Survey 1950-51 are as follows, with the rates of illnesses for 100,000 population in brackets:³

Diseases of the Respiratory System..... (182,290)
Colds and Influenza account for 85
per cent of these

¹ Per 100,000 population.

² Per 100,000 population.

³ Based on Department of National Health and Welfare and Dominion Bureau of Statistics, op. cit., pp. 130-131.

| | |
|---|----------|
| Infective and Parasitic Diseases | (31,280) |
| Measles | (10,560) |
| Chickenpox..... | (6,150) |
| Mumps and | (5,500) |
| Whooping Cough are the most frequent among this group..... | (2,310) |
| Symptoms and Ill-defined conditions | (28,150) |
| Diseases of the Digestive System. | (24,720) |
| Stomach disorders..... | (11,680) |
| and Toothache are the most frequent..... | (4,310) |
| Accidents | (15,000) |
| Lacerations and Open Wounds account for about one-quarter of the resulting injuries..... | (4,410) |
| Diseases of the Nervous System and Sense Organs | (12,530) |
| Diseases of the Ear and.. .. | (7,350) |
| Inflammatory Eye Diseases are the most frequent | (2,920) |
| Diseases of the Skin and Cellular Tissue | (7,190) |
| Allergic, Endocrine System, Metabolic and Nutritional Diseases | (2,790) |
| Diseases of the Genito-urinary System | (1,500) |

An important aspect of children’s health is the extent and type of chronic and permanent disability. The case load of known cases of such disabilities ranges around 2 per cent of the child population.¹ Among the leading causes are, though not necessarily in this order, psychiatric disorders, diseases of the nervous system and sense organs, diseases of the bones and organs of movement, and the infective and parasitic diseases.² Among Martin’s main conclusions from his study of childhood disability is that there is a deplorable lack of information in this field:

“It is hoped that sufficient evidence has been brought forward to show how little factual data there is available on the incidence of chronic disabilities in Canadian children. Still less is known of the proportion of these children who require special services. The inadequacy of the services presently provided is obvious. The theme running throughout this submission is the need for more information, and the co-ordination of existing services. In order to improve the present situation, it is recommended that

¹ Martin, J.K., *Chronic Disabilities in Children*, report prepared for the Canadian Conference on Children, Ste. Adele, 1960, p. 9.

² Ibid., p. 10.

active handicapped children's registries be provided in each Province, a National clearing house (central agency) be established in Canada, and co-ordination of services at all levels be planned."¹

In an attempt to assess the overall social and emotional impact of various handicaps, apart from their frequency, a survey of parents of handicapped children asked which in their opinion is the most severe problem a child could have.² The following ranking was established: 1) cerebral palsy, 2) mental retardation, 3) mental illness, 4) brain injury, 5) blindness, 6) epilepsy, 7) deafness, 8) polio, 9) heart trouble, 10) diabetes. One is, of course, reminded of conditions not on this list such as cystic fibrosis, muscular dystrophy and others, and one may be inclined to conclude with William Farr that often to each his own problem would seem the most severe. Nevertheless, the parents' attitude towards a child's handicap is important because it indicates to what extent moral and emotional support is needed in addition to physical help.

The nature of the health problems among children makes it clear that health at any age is in many respects dependent not only on the health at previous ages but that it extends into the previous generation: the health of the baby is very largely the result of the mother's health, especially during pregnancy. The need is, therefore, for continuing and integrated services. A survey of health services for children in Canada³ has as its first conclusion that "a widely recognized requirement which has not as yet been adequately met is prenatal education for prospective parents", and among other observations that "there is distinct evidence that there are fewer health services available for preschool children than for either infants or school-age children, and that this is the age group in which the child tends to drop away from supervised preventive medicine".⁴

Age 15-24

The vital statistics show the leading causes of death for the age group 20-44, which covers part of this age group as well as the subsequent one. The five causes singled out for this wider age group are with their respective death rate per 100,000 population:⁵

| <u>Cause</u> | <u>Rate</u> |
|----------------------------------|-------------|
| Accidents | 52 |
| Cardiovascular diseases | 32 |
| Cancer | 30 |
| Suicide | 10 |
| Influenza, bronchitis, pneumonia | 3 |

¹ Ibid., p. 119.

² Barsch, R.H., "The Handicapped Ranking Scale Among Parents of Handicapped Children", American Journal of Public Health, September 1964, pp. 1560-1567.

³ McCreary, J.F., Evaluation of Prenatal Programmes, Well-Baby Clinics, Preschool Clinics, School Health Services, Mental Health Programmes, and Special Hospital Facilities for Children, report prepared for the Canadian Conference on Children, Ste. Adele, 1960.

⁴ Ibid., p. 13.

⁵ Dominion Bureau of Statistics, Vital Statistics 1963, Ottawa: Queen's Printer 1965, p. 23.

Again, the relatively low rates for all these causes should be noted, a fact which brought suicide to prominence in this age group.

Morbidity rates are also generally lower than at earlier ages, as shown for physical illness in the Canadian Sickness Survey 1950-51. The causes and rates of illnesses per 100,000 population (in brackets) are:¹

| | |
|---|-----------|
| Diseases of the Respiratory System | (104,880) |
| Common cold (50,770) and Influenza (38,890) account for the majority of these illnesses | |
| Symptoms and Ill-defined Conditions..... | (22,240) |
| Diseases of the Digestive System | (14,790) |
| Accidents | (11,960) |
| Infective and Parasitic Diseases | (6,300) |
| Maternity and Complications..... | (6,230) |
| Diseases of the Nervous System and Sense Organs | (5,270) |
| Diseases of the Skin and Cellular Tissue | (4,910) |
| Diseases of the Genito-urinary System..... | (3,480) |

This is an age group which perhaps more than any of the other groups is profoundly affected by the social changes of our time. It is the group that includes the teen-age stage. Reference was made to the possible earlier physical maturity and generally later school-leaving age with a consequently later entry into the labour force but a tendency for earlier family formation. This goes hand in hand with improving economic levels of parents and more money available from public sources for continued education to fill the demand for higher educational levels in the present and future labour force. The responsibilities of the adolescent and his role in the community are thus reduced in some respects, while increased demands are made in others resulting in stresses which cannot fail to be reflected in the health status of this group.

Age 25-44

Though the order of causes of death may be roughly the same for this group as for the previous one, there is a noticeable increase in the age-specific mortality. The age-specific death rate, though still at a low level, more than doubles during this age period from 1.1 to 2.7 per 100,000 population.

Illness rates also begin to rise during these ages. The causes of physical illness and the rates of illnesses per 100,000 population, (in brackets) according to the Canadian Sickness Survey 1950-51, are:²

¹ Based on Department of National Health and Welfare and Dominion Bureau of Statistics, op. cit., pp. 132-133.

² Based on Department of National Health and Welfare and Dominion Bureau of Statistics, op. cit., pp. 134-135.

| | |
|--|-----------|
| Diseases of the Respiratory System | (129,040) |
| Common cold (59,890) and Influenza (49,060) account for most of these diseases | |
| Symptoms and Ill-defined Conditions | (35,690) |
| Headaches (12,560) account for about one-third of this group | |
| Diseases of the Digestive System | (18,680) |
| Stomach disorders (8,250) constitute the largest item in this group | |
| Accidents | (12,880) |
| The most frequent nature of injury in this age group switches from lacerations and open wounds to dislocations, sprains and strains (3,150) | |
| Diseases of the Nervous System and Sense Organs | (9,650) |
| Maternity and Complications | (8,130) |
| The majority are, as in the previous age group, deliveries without complication (5,760) | |
| Diseases of the Genito-urinary System | (7,180) |
| Diseases of the Bones and Organs of Movement | (6,160) |
| Diseases of the Skin and Cellular Tissue | (5,270) |
| Diseases of the Circulatory System | (4,990) |
| Allergic, Endocrine System, Metabolic and Nutritional Disorders | (3,650) |
| Infective and Parasitic Diseases | (3,370) |

In this age group the peak of family formation is usually reached and people are well established in their labour force participation. Participation in the labour force is, in fact, one of the main characteristics of the age range from about 20 to 65 years. It is the economically active group as contrasted to the children and the mostly retired older people. The latter two groups at both extremes of the life span are the most vulnerable from the health point of view and this is reflected in the mortality and morbidity statistics. Both children and the aged have been the subject of special inquiries into the various aspects of their well-being, including their health. No such general studies have been carried out for the middle-age group but a good deal of information, though scattered and largely uncoordinated, is available on industrial health, in the sense of the general health of members of the labour force as opposed to the narrower concept of occupational health which concerns itself mainly with specific hazards connected with certain occupations.

Industrial health research and statistics are nothing new. They originated from the interest of friendly societies and insurance companies in the actuarial

aspects of disability insurance. World War II generated great interest in the causes of sickness absenteeism in industry, an interest which later broadened into a more general concern of labour, management, and the industrial health physician in the health of employees and executives alike. The Industrial Hygiene Division of the Ontario Department of Health has undertaken to encourage and coordinate the collection of industrial health statistics. A number of large industries have been compiling such statistics for many years, among them the federal government for its employees though the latter study, covering some 150,000 persons, was unfortunately discontinued with the 1962 report. A systematic coordination of industrial health statistics in Canada could go a long way in providing health statistics for the population in the labour force. Such data would be valuable because of the light they could shed on existing differentials between age, sex, regional, and occupational groups. Furthermore, it is in this age group that the health problems of old age have their onset. The steady rise in the age-specific death rates is paralleled by a similar increase with age in the number of disability days per gainfully employed person:¹

| <u>Age</u> | <u>Disability Days per Year, per Person</u> |
|-------------|---|
| Under 25 | 6.9 |
| 25-44 | 7.1 |
| 45-64 | 11.0 |
| 65 and over | 13.6 |

Industrial morbidity statistics could be supplemented to advantage by the analysis of occupational mortality, something that has not been attempted in Canada for many years. The reasons are to be found in the limited accuracy and significance of occupational information on the death certificate and its relationship to the corresponding Census data which would have to provide the population basis for the calculation of rates.² While it is doubtful whether such statistics would be useful for the detection and study of particular specific hazards, they would nevertheless facilitate comparisons between broad groups and thus point the direction for further epidemiological study. It will furthermore become possible, with the refinement of record linkage techniques, to improve the information on the occupational status of the deceased. For the time being, however, it probably holds for Canada what has been said of the similar problem in the United States:

“At the present it must be admitted that searching for increased risk of specific causes of mortality in specific occupations through death certificate occupational entries is a rather crude and somewhat insensitive method. However, those who are interested have an excellent chance of recognizing increased risks of the order of several fold by this approach. It is also likely that a significant increased risk, when found, will understate the true risk.”

¹ Dominion Bureau of Statistics, *Disability Among the Gainfully Employed, Canadian Sickness Survey 1950-51*, Ottawa: Queen's Printer 1961, p. 15.

² See for instance the introduction to Dominion Bureau of Statistics, *Special Report on Occupational Mortality in Canada 1931-32*, Ottawa 1937, and Buechley, R., et al., “Death Certificate Statement of Occupation: Its Usefulness in Comparing Mortalities”, *Public Health Reports*, November 1956, pp. 1105-1111.

“Analysis of death rates by cause and by detailed occupation may reveal useful relationships.”¹

Age 45-64

The leading causes of death in this age group and the corresponding rates per 100,000 population are given as follows:²

| <u>Cause</u> | <u>Rate</u> |
|----------------------------------|-------------|
| Cardiovascular diseases | 456 |
| Cancer | 252 |
| Accidents | 55 |
| Influenza, bronchitis, pneumonia | 26 |
| Diabetes mellitus | 17 |

With the exception of the reversal of the order of accidents and the respiratory infections, we find here the same order of leading causes as prevail among the 65 and over, though the rates in the latter group are on a substantially higher level.

The causes of physical illness and the rates of illness per 100,000 population (in brackets) are as follows:³

| | |
|--|-----------|
| Diseases of the Respiratory System | (101,114) |
| Common cold (45,580) and Influenza (40,530) | |
| remain the chief causes in this group | |
| Symptoms and Ill-defined Conditions | (32,490) |
| Headaches (10,200) are the most frequent causes here | |
| Diseases of the Digestive System | (17,610) |
| Diseases of the Bones and Organs of Movement | (12,960) |
| Accidents | (11,880) |
| Dislocations, sprains and strains (2,460) | |
| are the most frequent single type of injury | |
| Diseases of the Circulatory System | (11,510) |
| Diseases of the Nervous System and Sense Organs | (9,710) |
| Diseases of the Genito-urinary System | (6,020) |
| Diseases of the Skin and Cellular Tissue | (4,220) |
| Allergic, Endocrine System, Metabolic and Nutritional Diseases | (4,080) |
| Infective and Parasitic Diseases | (2,370) |

This age group constitutes the last in what are usually considered the working ages before reaching retirement age at 65.

¹ Buechley, R., et al., op. cit., p. 1110.
² Dominion Bureau of Statistics, Vital Statistics 1963, Ottawa: Queen's Printer 1965, p. 23.
³ Department of National Health and Welfare and Dominion Bureau of Statistics, op. cit., pp. 134-137.

Age 65 and Over

The leading causes of death observed in the previous age group remain as the leading causes past the age of 65, but they strike with multiplied intensity. The death rate from cardiovascular disease is about 8 times, from cancer about 4 times, from the respiratory infections about 15 times, from accidents about 3 times, and from diabetes about 7 times the rate in the age group 45-64. For the 65 and over group, the respective causes and rates per 100,000 population are:¹

| <u>Cause</u> | <u>Rate</u> |
|----------------------------------|-------------|
| Cardiovascular disease | 3,829 |
| Cancer | 983 |
| Influenza, bronchitis, pneumonia | 362 |
| Accidents | 146 |
| Diabetes mellitus | 111 |

The frequencies of various causes of physical illness in this age group and the rates per 100,000 population (in brackets) according to the Canadian Sickness Survey 1950-51, are:²

| | |
|--|----------|
| Diseases of the Respiratory System | (97,670) |
| Bronchitis reaches the highest frequency rate of illnesses (6,120) of all age groups | |
| Symptoms, Senility and Ill-defined Conditions | (34,570) |
| Diseases of the Circulatory System | (20,530) |
| Diseases of the Bones and Organs of Movement | (19,100) |
| Diseases of the Digestive System | (17,710) |
| Diseases of the Nervous System and Sense Organs | (11,760) |
| Accidents | (10,550) |

The conclusion from the statistical evidence is that most, if not all, diseases may occur at any age and the aged are not wholly immune to any disorder, but with increasing age the chronic, slowly progressive disorders of a degenerative nature become more prominent. This was pointed out to the Special Committee of the Senate on Aging by Dr. E. D. Sherman who identified the following disorders as particularly significant to geriatric medicine: (1) circulatory impairments; (2) metabolic dysfunctions - diabetes, etc. -; (3) arthritis; (4) new growths.³ But even before mentioning these physical orders, Dr. Sherman referred to the psychiatric problems of aging resulting from the adjustment to a changing life situation.⁴ The interrelationship between mental and physical health is a major factor in evaluating either aspect.

¹Dominion Bureau of Statistics, *Vital Statistics 1963*, Ottawa: Queen's Printer 1965, p. 23.
²Department of National Health and Welfare and Dominion Bureau of Statistics, *op. cit.*, pp. 136-137.
³Senate of Canada, *Proceedings of the Special Committee of the Senate on Aging*, No. 6, December 5, 1963, p. 147.
⁴*Ibid.*, p. 145.

The greater extent and severity of illness in old age should not, however, lead to the stereotype image of old age being synonymous with illness and dependence: "There are many people over the age of 65 who are physically vigorous, well adjusted and emotionally comfortable. In the future their proportion can be even greater."¹ Speaking of physical disorder only, the Canadian Sickness Survey 1950-51 found that 20 per cent of people in the 65 and over group reported no illness during the entire survey year. This, of course, does not answer the question of how long these people remained illness-free after that year, but it is noteworthy that the percentage of illness-free people among the aged is about the same as in the younger age groups. But what illness does occur among the aged is generally more severe and of longer duration.

We thus find that the 8 per cent of the population who constitute this age group account for higher percentages of illness, disability, and mortality, as well as for some 20 per cent of personal health services.² Illnesses lasting on the average from 11.5 to 32.9 days among younger people, last 44.9 days among the 65 and over; disability days ranging 3.4 to 7.2 days at younger ages amount to 12.4 among the aged.³

A similar picture is obtained in regard to the hospitalization experience of the aged. The Dominion Bureau of Statistics prepared an abstract of such data⁴ from which certain highlights are assembled in Table 58. Comparative figures were added to this table for all groups taken together, and particularly also for the age group 45 to 64 to indicate that the patterns observed after the age of 65 have their onset well before this age is reached. Invariably, the extent of the utilization of hospitals increases among the older age groups.

The United States National Health Survey finds a low utilization among the aged of dental services. Persons 65 years and older made an average 0.8 visits to the dentist per person per year as compared with 1.5 visits per person in the total population. This is ascribed to the high proportion of edentulous⁵ persons in this age group.⁶

The same United States Survey observes that the average number of restricted-activity and bed-disability days per year per person 65 years and older "showed a marked increase as the amount of family income declined".⁷

¹ Ibid.

² Table 55.

³ Department of National Health and Welfare and Dominion Bureau of Statistics, *op. cit.*, pp. 142-143.

⁴ Dominion Bureau of Statistics, *Selected Statistics on the Older Population of Canada*, Ottawa: Queen's Printer 1964.

⁵ For instance, without natural teeth.

⁶ United States Public Health Service, "Older Persons, Selected Health Characteristics, United States July 1957 - June 1959", *Health Statistics from the U.S. National Health Survey, Series C - No. 4*, September 1960, pp. 46-47.

⁷ Ibid., p. 7.

TABLE 58
SELECTED INDICATORS OF HOSPITAL UTILIZATION BY PEOPLE AGED 45-64 AND 65 AND OVER,
CANADA, 1961

| | Male | | | Female | | |
|---|----------|---------|---------|----------|---------|---------|
| | All Ages | 45-64 | 65+ | All Ages | 45-64 | 65+ |
| General and Allied Hospitals | | | | | | |
| Separations per 100,000 population | 11,235 | 13,239 | 26,435 | 18,220 | 14,780 | 22,633 |
| Patient days per 100,000 population | 137,915 | 202,363 | 618,632 | 188,711 | 217,824 | 643,712 |
| Average days of stay | 12.8 | 15.2 | 22.2 | 10.4 | 14.7 | 25.9 |
| Percentage of population | 100.0 | 17.6 | 7.3 | 100.0 | 17.4 | 8.1 |
| Percentage of separations | 100.0 | 20.8 | 17.2 | 100.0 | 14.1 | 10.1 |
| Percentage of patient days | 100.0 | 25.8 | 32.8 | 100.0 | 20.0 | 27.5 |
| Psychiatric Institutions | | | | | | |
| First and readmissions per 100,000 population | 253 | 434 | 434 | 246 | 394 | 407 |
| Patients on books per 100,000 population | 439 | 796 | 1,004 | 391 | 727 | 1,046 |
| Tuberculosis Institutions | | | | | | |
| First and readmissions per 100,000 population | 77.6 | 142.1 | 201.5 | 54.1 | 63.2 | 77.7 |
| Patients on books per 100,000 population | | | | | | |
| Average months of stay of discharges | 6.9 | 6.9 | 8.7 | 6.4 | 6.4 | 7.1 |

Source: Based on Dominion Bureau of Statistics, Selected Statistics on the Older Population of Canada, Ottawa: Queen's Printer 1964, pp. 58-62.

The reference to the association between low income and the high amount of illness in old age illustrates the importance of their social adjustment for the health status of the older people. The income situation is only a part, though an important one, of the problem of adjustment. How important it is may be seen from the fact that the 1961 Census showed the median per capita income of the people 65 and over to be \$960. The mean income was about twice that amount (\$1,835) but two-thirds of these people had incomes below \$1,500 a year.¹ But it is not a matter of dollars alone. The underlying theme in the submissions to the Special Committee of the Senate on Aging and in the hearings conducted by the Committee is the problem of adjusting to the new life situation that comes with old age. It affects directly the psychological and psychiatric state of the person concerned. The alleviation of physical illness must await largely the discovery by medical science of preventive measures and cures for such diseases as cancer, heart disease, arthritis and the other chronic conditions. But in many instances these conditions are aggravated by the stresses that come with the changes in the social, economic, and family role of the aging.

Added to the usual drop of income at the point of retirement is the relinquishment of many of the previous interests of life thus causing in the aging person a sense of impotence; "he feels that he has little to give out, and that everything must be conserved".² In his testimony before the Senate Committee, Dr. Sherman summarized the causes of the problem thus:

"In the past century, old age in the western hemisphere, has lost respect and sympathy. Old age has been deprived of its rarity, and the rapidly changing technology in an industrial era has devaluated experience."³

In our modern society, we may add, retirement all too often means the end of active participation in the life which continues around us, and the change-over into a passive role where, at best, the aged person is cared for with kindness and his material needs are provided for. The solution lies, again to quote Dr. Sherman, in "the opportunity for the aging person to live as fully, individually and productively as possible for as long as he is able" which would minimize or even solve many of the psychiatric problems of the aging.⁴

The periods of adolescence and old age are stages in life where the changes in social participation probably exert the greatest stress. But while the adolescent has the incentive of goals yet to be achieved, society offers little to compensate for the disengagement from the labour force and family participation of the elderly. Retirement policies and practices are due for a serious reappraisal. As long as a fixed retirement age prevails, should it be changed, and if so in what direction? The increasing life expectancy would speak for a postponement of retirement but the progressive shortening of work hours may also favour a

¹ Senate of Canada, op. cit., p. 1254.

² Senate of Canada, op. cit., p. 145 (Dr. E.D. Sherman's testimony).

³ Ibid., p. 143.

⁴ Senate of Canada, op. cit., p. 146.

shortening of the working life span. This shortening, however, may come about in part at least at the time of entry into the labour force due to a longer period of education.

If the use of leisure time has been mentioned as a major factor in shaping physical and mental health in the future, the same applies also to the retired aged. Hobbies may often prove a palliative rather than a remedy.

Since aging often begins by reducing physical rather than mental capacity, mechanization and automation could favour the continued employment of the aging if they can keep up-to-date with technological progress. An old man, identified only as "Mr. W.", told the Special Committee of the Senate on Aging:

"As far as efficiency is concerned, the older person is more stable and confident and more reliable, but the fact is they are not as fast. You generally slow up, as far as age is concerned; but mentally your mind is as clear as long as it is active."¹

Some of their lost participation in family life may be regained by the aging by filling a void often left by working mothers. There may be a place again for grandparents, especially since grandparents today are generally younger than they used to be.

The individual as well as society must adjust to a new role for the aging and the aged:

"...to educate the aging individual himself not only to accept certain limitations which age may bring but also to recognize the individuality of aging and the fact that many activities may be preserved..."

"In addition, much can be done in educating the community to use the many talents remaining to the elderly."²

SEX DIFFERENTIALS

Throughout the discussion of health patterns in Chapters 2, 3 and 4, reference was made to sex differentials which became particularly apparent in the lower death rates among females, their longer life expectancy, and the steadily widening gap between the sexes. This phenomenon is by no means peculiar to Canada or North America but common to most countries:

"Sex differentials in mortality are well known to follow a fairly typical pattern. If only because more boys than girls are born in the world every year and because all must eventually die, the annual number of male deaths would normally always exceed the number of female deaths. The actual excess of male mortality is all the greater because age-specific death rates are, as a rule, higher among males than among females and this difference produces a greater life expectancy of the female sex. With very few exceptions, this is the common finding throughout the world."³

¹ Senate of Canada, op. cit., p. 83.

² Shock, N.W., "Public Health and the Aging Population", Public Health Reports, November 1961, p. 1026.

³ United Nations, Age and Sex Patterns of Mortality, Population Studies, No. 22, New York 1955, p. 16.

Futhermore, the patterns found in most countries confirm the already known fact that sex differentials in mortality widen as life expectancy grows longer.¹ Specific female causes of mortality such as maternal deaths are too small for any further reductions to make any substantial contribution to the difference between male and female deaths.²

In discussing the movement of the general death rate it was noted that it is a composite, being the net result of all disease-specific death rates. Therefore, in order to obtain some idea of the components of the male excess in the rate, the male and female death rates for the main diagnostic classes are shown in Table 59. Except for a very small part the difference of 24,435 cannot be attributed to the excess of males in the population. The latter accounts for only 1.8 per cent of the total male population, whereas the excess deaths constitute 28.4 per cent of all male deaths. The diagnostic classes could, of course, be further broken down into detailed categories but the table will suffice to point out the main components of the higher male mortality. Numerically the largest class are the diseases of the circulatory system, followed by accidents, cancer, and the diseases of the respiratory system. Only in four of the 15 classes shown were there more female deaths, maternal deaths being among them.

Why have men not fully shared in the mortality improvements experienced by women, and can we hope to remove whatever the obstacles may be to bring male mortality on a par with the female? Madigan formulated, and attempted to answer the questions more specifically as follows:

“Are these differentials in rates of dying chiefly reflections of the greater sociocultural pressures and strains which our culture lays upon male shoulders? Or are the differentials rather to be associated mainly with biological factors related to sex?”³

In order to find the answer, Madigan set out to study mortality in a male and female group “in which cultural stresses and strains had been so standardized between sexes that one could observe the operation of biological factors in comparative isolation”.⁴ The subjects chosen for the study were personnel of Roman Catholic religious brotherhoods and sisterhoods whose life was very similar in regard to the daily routine as well as to the exposure to stress or the lack of it. The findings of the study were (1) that biological factors are more important than sociocultural pressures and strains in relation to the differential sex death rates; and (2) that the greater sociocultural stresses associated with the male role in our society play only a small and unimportant part in producing the differentials between male and female death rates.⁵ An editorial of the *Journal of the American Medical Association*, in commenting on the above mentioned study, refers to the finding in the natural sciences that the female outlives the male in most species

¹ Ibid.

² They amounted to 165 in 1963, compared with the over 24,000 excess of male deaths.

³ Madigan, F.C., “Are Sex Mortality Differentials Biologically Caused?” *Milbank Memorial Fund Quarterly*, April 1957, p. 203.

⁴ Ibid., p. 204.

⁵ Ibid., p. 209.

of the animal kingdom.¹ A study in Canada of sex differences in mortality during infancy, when the extraneous stresses are still non-existent, ascribes the early excess of male over female deaths to the “inferior vitality” of the male sex before birth, in the first day after live-birth, through every week of the first month and in each quarter of the first year of life.² This relates to the still mysterious question of the sex balance among births where an excess of male births is the rule;³ in Canada there were 1,053 male births per 1,000 female births in 1963. It has been surmised that through some influence of wartime conditions male births increase in or after times of war. All these findings and hypotheses can only give rise to new speculation as to which is the cause and which the effect. Is male mortality higher, because more males are born, or are there more male births to compensate, by some natural force, for the higher mortality?

TABLE 59
MALE AND FEMALE EXCESS OF DEATHS
BY MAIN DIAGNOSTIC CLASSES, CANADA, 1963

| | Number of Deaths ¹ | | Excess | |
|--|-------------------------------|--------|--------------------------|--------|
| | Male | Female | Number of Deaths Male | Female |
| All Causes | 85,901 | 61,466 | 24,435 | |
| I. Infective and parasitic diseases | 954 | 455 | 499 | |
| II. Neoplasms..... | 13,870 | 11,562 | 2,308 | |
| III. and IV. Allergic disorders and endocrine, metabolic and blood diseases | 1,856 | 1,958 | | 102 |
| V. Mental, psychoneurotic and personality disorders..... | 274 | 200 | 74 | |
| VI. Diseases of the nervous system and sense organs..... | 8,333 | 8,803 | | 470 |
| VII. Diseases of the circulatory system | 34,376 | 22,712 | 11,664 | |
| VIII. Diseases of the respiratory system | 6,022 | 3,801 | 2,221 | |
| IX. Diseases of the digestive system ... | 3,179 | 2,310 | 869 | |
| X. Diseases of the genito-urinary system | 1,882 | 1,147 | 735 | |
| XI. Maternity and complications..... | | 165 | | 165 |
| XII. and XIII. Diseases of the skin and musculoske- letal system | 255 | 347 | | 92 |
| XIV. Congenital malformations | 1,454 | 1,245 | 209 | |
| XV. Certain diseases of early infancy ... | 4,158 | 2,882 | 1,276 | |
| XVI. Symptoms, senility, and ill-defined conditions | 687 | 542 | 145 | |
| XVII. Accidents, poisoning and violence | 8,601 | 3,337 | 5,264 | |

¹ Based on Dominion Bureau of Statistics, Vital Statistics 1963, Ottawa: Queen’s Printer 1965, pp. 112-127.

¹ “Why Do Females Live Longer?”, editorial, Journal of the American Medical Association, April 26, 1958, p. 2184.

² Wyllie, J., “Sex Differences in Infant Mortality”, Canadian Public Health Journal, March 1933, p. 184.

³ Possibly attributable to the greater tendency for the first born child to be a male than for later born children (McMahan, “An Empirical Test of Three Hypotheses Concerning the Human Sex Ratio at Birth in the United States, 1915-1948”, Milbank Memorial Fund Quarterly, July 1951, p. 288).

An examination of Table 59 may help to narrow down the reasons for the excess male mortality. Accidents account for over one-fifth of the difference, leaving little doubt that in this case at least it is the greater exposure of the male to accident risks. It will also be recalled that in the case of motor vehicle accidents the mean age at death for males was reduced by 4 per cent between 1951 and 1961, whereas it increased by 6 per cent for females.¹ The male excess mortality from neoplasms is particularly pronounced for lung and stomach cancer, whereby the former has been ascribed to the greater risks of men from smoking and possibly air pollution. Similar circumstances could be at work in regard to mortality from respiratory diseases. Almost half of the male excess mortality, however, is due to the greater mortality from diseases of the circulatory system where the question of biological versus extraneous factors remains to be answered. The answer may possibly be found in a combination of both factors if it were established that women are biologically better equipped to resist stress and strain.

Then there is the different morbidity pattern. If females are apparently more ill than males, is it because they are more conscious of their health, take better care of themselves, and thus perhaps reduce mortality?

The Canadian Sickness Survey 1950-51 found the following percentages of people sick sometime during the survey year:²

| Age | <u>Any Illness</u> | | <u>Disabling Illness</u> | |
|-------|--------------------|-------------|--------------------------|-------------|
| | Male % | Female % | Male % | Female % |
| -15 | 87.3 | 87.4 | 69.3 | 69.8 |
| 15-24 | 69.3 | 76.2 | 49.0 | 59.4 |
| 25-44 | 74.7 | 85.0 | 49.6 | 59.7 |
| 45-64 | 73.4 | 79.5 | 50.9 | 51.8 |
| 65+ | 77.6 | 81.7 | 53.0 | 56.1 |

In the age groups roughly from 15 to 44 the female percentages are affected by conditions related to maternity which are counted as sickness. Among children, the female excess is small. It is more pronounced at ages over 45, when the percentages are not affected by maternity conditions, and it is less pronounced for disabling illness than it is for any kind of illness.

More females (80.4 per cent) than males (74.9 per cent) develop new illnesses.³ More females (16.2 per cent) than males (12.4 per cent) are sick on any day of the year.⁴ More males (7.9 per cent) than females (6.3 per cent) reported permanent physical disabilities.⁵

¹ See p. 263.

² Department of National Health and Welfare and Dominion Bureau of Statistics, *op. cit.*, p. 99.

³ *Ibid.*, p. 105.

⁴ *Ibid.*, p. 108.

⁵ *Ibid.*, p. 113.

Regarding the duration of ill health, the Sickness Survey shows the following number of days per person per year:¹

| Age | Any Illness Days | | Disability Days | |
|-------|------------------|--------|-----------------|--------|
| | Male | Female | Male | Female |
| -15 | 35 | 36 | 11 | 10 |
| 15-24 | 27 | 36 | 8 | 9 |
| 25-44 | 42 | 66 | 9 | 10 |
| 45-64 | 61 | 83 | 17 | 15 |
| 65+ | 95 | 116 | 29 | 29 |

While females have more days of illness, there is hardly any difference between sexes when it comes to disabling illness even though maternity is included. This may indicate that disability among females was under-reported because the concept is less clear-cut for a housewife than for a man who normally leaves the house to go to work.

A similar picture is obtained for the average length of sickness (days per sickness):²

| Age | Non-disabling Sickness | | Disabling Sickness | | Sickness in Bed | |
|---------------|------------------------|--------|--------------------|--------|-----------------|--------|
| | Male | Female | Male ³ | Female | Male | Female |
| -15..... | 18.4 | 20.4 | 7.0 | 6.5 | 4.9 | 4.4 |
| 15-24..... | 28.1 | 30.0 | 9.4 | 8.5 | 5.4 | 6.0 |
| 25-44..... | 34.3 | 42.0 | 10.9 | 9.2 | 7.0 | 6.7 |
| 45-64..... | 59.4 | 67.5 | 20.1 | 15.6 | 10.2 | 10.1 |
| 65+..... | 98.1 | 105.9 | 31.0 | 28.5 | 18.0 | 18.8 |
| All ages..... | 34.0 | 40.7 | 11.7 | 10.2 | 7.1 | 7.1 |

Among federal civil servants, men had 46,383 illnesses per 100,000 population, compared with 81,420 among females.³ All age groups showed a substantial excess of the female rate over the male. The average days per illness, on the other hand, were higher for men (14.9 days) than for women (11.5 days).⁴ These data refer generally to absences of more than 3 days duration. A study in the United States came to the conclusion that “it seems very likely that the higher incidence of illness reported by the women, the greater amount of disability they experienced, and the greater number of visits that they made to the doctor, were largely the result of culturally determined differences in the attitudes toward what constitutes illness and what creates an acceptable reason for disability in men and in women”.⁵ And, the same report emphasizes, the illnesses reported

¹ Ibid., p. 115.

² Ibid., p.125.

³ Dominion Bureau of Statistics, *Illness in the Civil Service*, Statistical Report 1962, Ottawa: Queen's Printer 1964, p. 56.

⁴ Ibid., p. 32.

⁵ Hinkle, L.E., et al., "Women in Industry, II. An Examination of the Relation Between Symptoms, Disability, and Serious Illness, in Two Homogeneous Groups of Men and Women", *American Journal of Public Health*, September 1960, p. 1336.

by women as cause of absenteeism were bona fide illnesses but often less severe than those reported by men.¹

The discussion of health differentials between the sexes can, at this stage, perhaps best be concluded with a statement from the Medical Officer in an editorial discussing sex differences in respiratory diseases:

"We feel sure that our readers will agree that this is a fascinating subject worthy of further study. The practical application of what might be discovered is necessarily uncertain but it might throw a good deal of unexpected light upon problems relating to the genetic element in aetiology."²

HEALTH IN THE NORTH

In a country as vast and varied as Canada there are many regional differences in the health of the people and the patterns of health services. A study of such differences would constitute a proper part of an inquiry into the health status of Canadians. It would have been particularly appropriate to review the situation in the provinces and territories since the primary responsibility for health services rests with the provincial and territorial administrations. This, however, would have exceeded the scope of this study which is intended primarily to provide the Royal Commission on Health Services with a broad general picture in regard to the Canadian people as a whole.

To the extent that this study serves a useful purpose, each of its parts could have been prepared for a particular province or any other broader or narrower region which in some way may be significant for a study of the condition of the people in the particular area. These may be health regions, economic regions, health unit areas, individual communities, hospital areas, down even to the practice of a physician or group of physicians, where a knowledge of local problems and comparisons with similar areas and provincial, national, or international standards is desirable. Such comparisons are an essential tool in epidemiology of health and disease, as well as in the planning and evaluation of health services. An appraisal of the people's health for Canada as a whole may serve as the first step in that direction and perhaps stimulate the collection of meaningful data to fill the present gaps in our knowledge.

Reference has also been made to problems peculiar to various socio-economic groups in the population, and these too would warrant further study and comparisons of their experience with that of others.

If, of all these many divisions of the country and groups of people, the North is singled out here for a separate brief review, it is because it is a fairly well-defined area with its own system of health services, different in many respects from the situation in the provinces. Another reason is that the North has remained one of the least known and hence most neglected areas in Canada's development.

¹ Ibid., p. 1334.

² "Sex and Diathesis — How Far Related?", editorial, Medical Officer, April 18, 1957, p. 217.

Because of the organization of services and the availability of statistics, the North is understood in this context mainly as comprising the Yukon and Northwest Territories, but much of what is said will be applicable also to the northern parts of the provinces and scattered and isolated population groups elsewhere. Most of the information presented here is taken from existing sources but some limited appreciation of the problems of the North was obtained on a short trip made possible through the generous help of the Royal Canadian Mounted Police and the headquarters and field staff of the Northern Health Service of the Department of National Health and Welfare, as well as of the Department of Northern Affairs and National Resources.

The health problems of the indigenous people, Indians and Eskimos, are closely related to their appalling living conditions. Their problems are understated in the statistics applying to either the Territories as a whole where the statistics apply to the entire population of these areas.

If health conditions are poor and the provision of services presents problems which do not exist elsewhere in Canada, their solution is in some respects helped by the fact that the number of people involved is comparatively small: 24,000 in the Northwest Territories in 1962, and 15,000 in the Yukon.

The annual report of the Commissioner of the Northwest Territories aptly summarizes the problems:

"The Eskimo birth rate of 59 per thousand population continued to be one of the highest in the world. The Indian rate was 46 and the white status rate 38. The all Canada rate is 26.9. At the same time, the Eskimo death rate continued to be high at 21 per thousand population — nearly three times the national rate. The Indian rate was 9 per thousand. Fifty-five per cent of the Eskimo deaths were those of infants under the age of one year and 62 per cent of the deaths were those of children under 15 years. The Eskimo infant mortality rate was 193 per thousand live births compared with the Indian rate of 77 and the white status rate of 21. The national rate in 1960 was 27.

"Tuberculosis case-finding surveys were carried out throughout the Territories. The percentage of the population turning out for surveys in some locations, particularly the white status population was somewhat discouraging but everything possible is being done to bring about an increase. There were 9 deaths from tuberculosis in 1961, three more than in 1960. Of the nine, six were Eskimo and three were Indians.

"Venereal disease continued to be a matter of concern. The gonorrhoea rate was six times the national rate and continued to rise. Although the incidence of syphilis was many times the national rate in 1959 and 1960 there was only one reported case in 1961.

"The chief cause of death continued to be pneumonia. There is a very strong connection between this disease and the factors of low resistance to infection, climate and a low standard of living — particularly poor housing standards."¹

¹ Annual Report of the Commissioner of the Northwest Territories 1961-62, Northwest Territories, Sessional Paper No. 3, 1962 (Second Session), pp. 8 and 9.

The Yukon occupies a situation – geographically, socially, economically, and administratively – somewhere between the organized provincial areas and the frontier conditions of most of the Northwest Territories.

In both territories conditions have been improving in recent years in most respects, as the following comparisons for the period from 1953 to 1963 indicate:¹

| | Yukon | | Northwest Territories | |
|------------------------------|-------|------|-----------------------|-------|
| | 1953 | 1963 | 1953 | 1963 |
| Crude death rate..... | 12.9 | 5.4 | 18.4 | 11.1 |
| Standardized death rate..... | 13.5 | 6.8 | 18.5 | 11.9 |
| Infant mortality rate..... | 49.6 | 32.1 | 112.4 | 104.2 |
| Neonatal mortality rate..... | 13.1 | 14.0 | 41.4 | 45.7 |

Neonatal mortality has not shared in the general improvement but the figures are based on small frequencies and, therefore, chance fluctuations may affect them to some extent. It may also be that more complete registration of these deaths has something to do with the apparent trend. But even where there has been a definite improvement, the record is still poor. The following selected indicators illustrate the differences that still prevail in the health status of the people in the Yukon and the Northwest Territories, as compared with Canada as a whole in 1963.²

| | Canada | Yukon | Northwest Territories |
|---|--------|-------|-----------------------|
| Birth rate..... | 24.6 | 33.3 | 48.4 |
| Crude fertility rate (women 15-49)..... | 105.7 | 155.9 | 241.9 |
| Illegitimate births as per cent of all live births | 5.3 | 15.6 | 12.3 |
| Percentage of births in hospital..... | 98.3 | 93.0 | 64.3 |
| Crude death rate..... | 7.8 | 5.4 | 11.1 |
| Standardized death rate..... | 7.6 | 6.8 | 11.9 |
| Percentage of deaths in hospital..... | 64.9 | 40.7 | 36.8 |
| Death rate from infectious diseases..... | 7.5 | 13.3 | 66.7 |
| Death rate from respiratory tuberculosis..... | 3.6 | --- | 25.0 |
| Death rate from diseases of the respiratory system..... | 52.0 | 46.7 | 216.7 |
| Infant death rate..... | 26.3 | 32.1 | 104.2 |
| Maternal death rate..... | 3.5 | --- | 8.6 |
| Age-specific death rate ages 1-4..... | 1.1 | 1.0 | 8.2 |
| Rate of natural increase..... | 16.8 | 27.9 | 37.3 |
| Mean age at death: | | | |
| Male..... | 60.5 | 47.6 | 20.2 |
| Female..... | 64.1 | 36.2 | 25.1 |

¹ Dominion Bureau of Statistics, Vital Statistics 1963, Ottawa: Queen's Printer 1965, pp. 94, 106, 163, 177.

² Ibid., pp. 14, 73, 77, 97, 98, 100, 112, 113, 120, 121.

The estimated rates per 100,000 population of tuberculous first admissions to institutions were in 1961:¹

| <u>Group</u> | <u>Rate</u> |
|--------------|-------------|
| Eskimos | 1,500 |
| Indians | 340 |
| Other | 27 |

Mortality and morbidity from causes particularly sensitive to environmental factors are substantially higher in the Yukon and Northwest Territories than in Canada as a whole and this affects the over-all mortality and longevity pattern. While the infant mortality rate in the Northwest Territories is about four times the Canadian rate, mortality among children aged 1–4 is about eight times as high.

If conditions in the Yukon differ from those in the Northwest Territories, it is important to bear in mind that the latter also are by no means homogenous. As roads and railroads keep pushing north of the 60th parallel, some communities there have begun to develop in ways similar to their southern counterparts. The Mackenzie District is being settled and becoming accessible faster than the remaining part of the Northwest Territories where we still encounter small nomadic bands as well as permanent settlements. Some of these settlements have a sound economic basis, others have developed because people have gathered at sites of weather stations or other installations, often still waiting to bridge the gap between their traditional life and the new. There we run into conditions described as “inhuman” by one of the public health nurses, a far cry from the romantic notions conveyed about Eskimo life by children’s books and movies. Walking through a tent settlement on a cold September morning with the wind and rain lashing against flimsy tent walls, there is little romance left when one hears babies crying and whimpering, and children and adults coughing inside. Outside is the stench of human and animal excretion and of rotten food scraps. And these tents, far less substantial than those in which campers or scouts may spend a few nights, house not only all the family members but also their implements and other belongings. This is the environment in which people spend a lifetime, where babies are born and reared, and the sick cared for.

In a few brief sentences Emily Carr described the plight of one of her Indian friends:

“Every year Sophie had a new baby, almost every year she buried one. Her little graves were dotted all over the cemetery. I never knew more than three of her twenty-one children to be alive at one time. By the time she was in her early fifties every child was dead and Sophie had cried her eyes dry. Then she took to drink....”²

Things have improved since Emily Carr wrote and substantial beginnings have been made against the odds of Northern logistics in the provision of health services, housing and some means of sanitation; but hundreds of families still

¹ Estimates based on Dominion Bureau of Statistics, Tuberculosis Statistics, 1961, Ottawa: Queen’s Printer, 1963, p. 61.

² Carr, Emily, Klee Wyck.

live under conditions that would not be tolerated elsewhere even in a more moderate climate. While it is difficult to generalize under the varying and rapidly changing conditions in the North, the high infant mortality rate can still be traced to the lack of adequate housing. It is obvious that the same conditions facilitate the spread of tuberculosis and other infectious diseases.

The main problems are, in varying degrees, common to the entire area. They are: small populations scattered over a large territory, harsh climate, lack of communications and transportation, few social and community services, and all of these are closely related to the difficulties of economic development in these areas.

To grasp fully the problems and the challenge of the North, one has to wing over the hundreds and hundreds of miles, seemingly endless, looking down on nothing but barren tundra with no signs of human habitation and no trace of human activity. One wonders how man ever ventured into this land and why, long before the advent of the airplane. Statistics alone cannot quite convey this impression but the figures of population density may serve as an illustration. In 1964, the population density was as follows:¹

| | |
|-----------------------|--|
| Yukon | 0.08 people per square mile ² |
| Northwest Territories | 0.02 people per square mile |
| Rest of Canada | 8.3 people per square mile |

Thus, the population density in the Yukon is about one-hundredth, and that in the Northwest Territories about one-four-hundredth of that in the area covered by the provinces. Or, alternatively we find that there are over 50 square miles of area per person in the Northwest Territories, about 13 in the Yukon, and only about one-tenth (0.12) of a square mile per person in the rest of Canada, and even this part is only very thinly populated in comparison with many other parts of the world.

While cities like Toronto or Vancouver are usually frost-free from early in April or May until October or early November,³ some parts of the Arctic have hardly any period free from frost and others have only a brief period of six or eight weeks.⁴

Under these circumstances, the problem of providing health services is common to all segments of the population: "Getting medical and public health service to them is a challenge to modern logistics and to medical and nursing ingenuity, and the greatest test in Canada of the pioneering spirit, of professional devotion and personal courage".⁵

¹ Based on population estimates as of October 1, 1964.

² Including land and fresh water area because the latter too has a bearing on distances, transportation, and communication.

³ Victoria is frost-free from the end of February until early December.

⁴ Dominion Bureau of Statistics, Canada Year Book 1963-1964, Ottawa: Queen's Printer 1964, pp. 53-55.

⁵ Northern Health Service, Health Services for Small Population Groups in Outlying Areas of Northern Canada, brief submitted to the Royal Commission on Health Services, April, 1963, p. 1.

Both the indigenous people in the North and the migrants from the South encounter mental health problems resulting from the adjustment to new conditions vastly different from the accustomed ones. The Eskimo and Indian have to adjust to the changes brought into their life by the newcomers from the South. Those coming to the North have to adjust to a forbidding land and a way of life which to many would be bearable only for a short period of time.¹

The cold, of course, is a serious hazard to all during the long and severe northern winter. The short summer brings, along with some cherished warmth, the problem of biting insects. The attacks by swarms of these insects have more than a nuisance effect. A Russian scientist summarized the importance of the problem in these words:

"The pain from stings, a reaction of the host's skin, sometimes lasts a considerable time while the intensity and incessant character of the attacks makes these torments intolerable. As a consequence biting flies² are one of the essential factors of the environment which have an unfavourable effect on the health and mental stage of people, decreasing their capacity for work and lowering their resistance to diseases. In the lumbering season the massive attacks of biting flies not only reduce work productivity, but greatly increase the incidence of occupational injuries. The scratching of bites sometimes leads to impetiginous infections. Blood-sucking Dipterons can be direct carriers of infection, especially tularemia, even in the tundra. Biting flies are of no small importance, also, in connection with livestock raising in the North. They are one of the scourges of the reindeer herder."³

Protection is now provided generally on an individual basis by mechanical means and synthetic repellents, but a systematic over-all government plan is advocated by the same author.⁴

The Northern Health Service of the Department of National Health and Welfare has achieved a great deal in improving health conditions in the North and services are being continually improved. The nurses in isolated stations and the medical field staff are as dedicated and competent as they must be if they are to succeed under trying conditions. But the outstanding health problems are those created by environmental conditions and there is a limit, therefore, to what medical science can do. To be successful, the health services must now be matched by social development in the form of housing, sanitation, general community services, and last but not least, education.⁵ All these must be supported by economic development.

¹ See also Willis, J.S., Martin, M., "Mental Health in Canada's North", 1962, mimeographed.

² Meaning all blood-sucking flying insects.

³ Beklemishev, V.N., "Protection of Inhabitants of the North Against Biting Flies", Problems of the North, a translation of Problemy Severa, No. 6, Ottawa: National Research Council 1962, p. 91.

⁴ Ibid., p. 93.

⁵ Indian and Northern Health Services, Department of National Health and Welfare, and Northern Administration Branch, Department of Northern Affairs and National Resources, Eskimo Mortality and Housing, Ottawa, 1960, and Moore, P.E., An Epidemic of Tuberculosis at Eskimo Point, Northwest Territories, Ottawa: Queen's Printer, 1963.

Education and economic development take time, perhaps generations. The need for housing and sanitation is immediate. There is the matter of cost and logistics. As to the cost, the comparatively small populations involved eases the problem. There are about 12,000 Eskimos in Canada, or perhaps about 2,000 or 3,000 families. Indians who would require better housing are more numerous, but most of them are in areas that are more easily accessible and where at least lumber is readily available, while it all has to be shipped into the treeless arctic and subarctic region.

An outbreak in one small village produced 80 cases of active tuberculosis within six months, leading the investigator to comment: "Needless to say I can think of better ways for us to spend the half million dollars in public money that this epidemic will cost us — ways that would have benefited these children a good deal more."¹ And this sort of thing occurs all the time.

The logistics? The experts in the various fields have available techniques to overcome the great difficulties that exist. What they need is the necessary resources. There are many fields, such as sanitation, where known techniques are far from perfect but this is characteristic of all technology: improvements are being made all the time. Housing in the North must take into account not only the prevailing climatic conditions and circumstances such as family size but also the fact that for eight or ten months much more of one's life is spent indoors than is the case in the southern parts of the country.² But more than bread and housing will be needed in the North for man to live if conditions are to approximate those in other parts of the country. Community services and facilities for community life must keep pace with population size and provision for the basic needs if the present hazards of the North to physical and mental health are to be eliminated or at least greatly reduced.³

If there remains any doubt that the social and environmental problems can be solved, or conditions at least vastly improved even pending long-term developments, we may look at what other countries have accomplished in their arctic regions. The spectacular community development in the northern areas of the Soviet Union may be attributed to easier access because of the large rivers draining into the northern sea. This and better conditions in Alaska could also be explained by the greater resources of the Soviet Union and the United States. In Scandinavia, the problem is one of smaller dimensions altogether. But what

¹ Moore, P.E., *op. cit.*, p. 1.

² Arnol'di, I.A., Tsvetaeva, E.M., "Review of Discussions", *Problems of the North*, a translation of *Problemy Severa*, No. 6, Ottawa: National Research Council 1962, p. 251.

³ Slavin, S.V., "Economic Premises for the Development of the National Economy of the North of the U.S.S.R." *Problems of the North*, a translation of *Problemy Severa* No. 6, Ottawa: National Research Council 1962, p. 112.

Slavik speaks of television, clubs, cinemas, libraries and other institutions. A.B. Karlik envisages hot house gardens, hotels and restaurants, swimming pools, and artificial beaches, playgrounds in the gardens, all of which would fall within the coast range of hospitals and Sanatoria (Arnol'di, I.A., Tsvetaeva, E.M., *op. cit.*, p. 251).

about Denmark’s accomplishments in Greenland which is 2,000 miles away? Statistics regarding the infant mortality among the local populations in Canada and Greenland demonstrate the effect of the respective developments:

| | Infant Mortality Rate 1961 per 1,000 Live Births |
|-------------------------------------|---|
| Northwest Territories: ¹ | |
| Indians | 81 |
| Eskimos | 185 |
| Greenland: ² | |
| Children of women born in Greenland | 65.9 |

While in Canada’s North tents and snowhouses are still a common sight, a description of conditions in Greenland four years ago can say:

“In general, the Greenlanders now live in large or small wooden houses, their size and appearance governed by the man’s resources and his wife’s skill in housekeeping.....

“....as a general rule, the houses are big enough to hold a kitchen and living room below and one or two bedrooms above.”³

Illiteracy was abolished among Greenlanders more than a hundred years ago.⁴

The population of Greenland (33,000 in 1961) is only slightly smaller than that of the Yukon and the Northwest Territories (39,000). The Danes have a considerably lower per capita income than Canadians and their Gross National Product is less than one-fifth of Canada’s.⁵

Denmark may have had a head start on Canada, but with our Centennial approaching and with increasing affluence, we should be in a position to catch up. We must, if the North is to become and remain an integral part of Canada, and its people are to share fully in our progress after a century of nationhood. Inaction or half-hearted measures can only lead to further segregation and alienation of people who, as fully accepted partners, could be the greatest asset in the North where they are at home, whereas others go there only reluctantly and seldom stay long enough to be concerned with local development.

What are we doing to make them realize the meaning of the Centennial? Art and sport centres and historic monuments are worthy memorials for our cities. In the North, the monuments might well be healthy communities. This is the message

¹ Northern Health Service, Report on Health Conditions in the Northwest Territories 1963, Ottawa, 1964 (mimeographed), Table 5.

² Sundhedstilstanden i Grønland, Landslaegens Arsberetning 1961, Beretninger Vedrørende Grønland, Sydgrønlands Bodtrykkeri, 1963, p. 19.

³ The Royal Danish Ministry of Foreign Affairs, Greenland, Denmark: Perfecta — 1961, pp. 50-52.

⁴ Brun, E., Greenland Today (mimeographed), pp. 4 and 5.

⁵ United Nations, Year Book of National Accounts Statistics 1962, New York, 1963.

that Robert Service heard in his sourdough days when the Yukon called out to him:

“Dreaming of men who will bless me, of women esteeming me good;
Of children born in my borders, of radiant motherhood;
Of cities leaping to statute, of fame like a flag unfurled,
As I pour the tide of my riches in the eager lap of the world.”

MORE SOCIO-ECONOMICS OF LIFE AND HEALTH

“Sickness is poor-spirited and cannot serve any one: it must husband its resources to live. But health or fullness answers its own ends, and has to spare, runs over, and inundates the neighborhoods and creeks of other men’s necessities.”

— R. W. Emerson —
Conduct of Life: Power

This study has emphasized the social aspects of health and illness rather than their medical characteristics although it would be impossible to separate the two completely. The present chapter is intended to draw some conclusions regarding these aspects. The term “socio-economic” has become a byword in the study of human affairs. Although it would be difficult to define and its contents difficult to circumscribe exactly, its very generality denotes conveniently a wide and varied range of characteristics. And although economic phenomena are, strictly speaking, part of the wider social scene, the term makes it clear that both economical and non-economical matters are being considered. In this context the term socio-economic is used to clearly denote the recognition that life and health have definite economic aspects but that the implications for the individual and society transcend purely economic considerations.

This is not to deny or belittle the existence and importance of the economic aspects of health which have been studied and described extensively in Canada and elsewhere. Reference is made in particular to the economic studies carried out for the Royal Commission on Health Services by Madden, Hanson, Brown, and Berry;¹ economic aspects are also discussed in other studies for the Commission. The economic questions in relation to health and health care can perhaps be condensed very crudely into two basic ones: 1) what health services can we afford, or can we afford the best possible health services for Canadians as recommended by the Royal Commission on Health Services; and 2) does it pay to have good health, or what are the economic benefits, direct and indirect, as opposed to the economic cost of health services?

¹ Madden, J.J., *Economics of Health*; Hanson, E.J., *The Public Finance Aspects of Health Services*; Brown, T.M., *Canadian Economic Growth*; Berry, C.H., *Voluntary Medical Insurance and Prepayment*; studies prepared for the Royal Commission on Health Services, Ottawa: Queen’s Printer, 1964.

Both types of questions will have to be answered in the context of the present and future Canadian situation.

The first of the two questions has been thoroughly studied by the Royal Commission on Health Services. The Commissioners felt that any recommendations they would make involving expenditures could be realistic only if sound cost estimates could be presented and if the cost could be absorbed without serious repercussions to the country's economy. The Commission concluded that the nation can afford the recommended universal and comprehensive health services programme. By 1971, the programme would cost Canadians 6.4 per cent of their Gross National Expenditure in constant (1957) dollars, and 7.4 per cent by 1991, an increase of 2.2 percentage points over the thirty-year period from 1961 to 1991. This, the Commission states, can be absorbed by the Canadian economy "without in any way affecting detrimentally the requirements of the Canadian people for other goods and services to build a stronger economy and to achieve a higher standard of living".¹ Net expenditures on health and sanitation by all governments in Canada amounted to 3.44 per cent of Gross National Expenditure in 1961; of these, general and public health services, and sanitation, always recognized as legitimate areas for public financing, amounted to 0.74 per cent.² Depending on the degree and speed in implementing recommendations of the Royal Commission on Health Services, total government spending on health services may rise to 4.5 per cent of Gross National Expenditure by 1966, to more than 5 per cent by 1971, and eventually to 5.5 per cent, all of which Canadians can afford in their expanding economy.³ When speaking of the ability to afford, we should add: or choose to afford.⁴ For no matter how small the expenditure for a certain purpose, alternative choices – though possibly foolish – could be made. But while we know that individuals do make foolish choices, such as buying liquor instead of milk for their children or even proper food for themselves, we can with greater confidence look to society collectively through its elected representatives to make a choice best fitted for its future welfare. Moneys recently allocated for things cultural and spiritual in connection with Canada Council activities or centennial projects would seem to be proof that Canadians are prepared to devote additional income not entirely to more material possessions. The Royal Commission on Health Services found general willingness in all quarters to pay for the additional cost of increased and improved health services.⁵

What is the motive behind this apparent unanimity among the various groups of the population and, in principle, among all political parties? There would seem to be general acceptance of the 6 or 7 per cent of the Gross National

¹ Royal Commission on Health Services, Vol. I, Ottawa: Queen's Printer, 1964, p. 85.

² Hanson, E.J., *The Public Finance Aspects of Health Services*, study prepared for the Royal Commission on Health Services, Ottawa: Queen's Printer, 1964, p. 136.

³ Hanson, E.J., *op. cit.*, p. 125.

⁴ Brown, T.M., *Canadian Economic Growth*, study prepared for the Royal Commission on Health Services, Ottawa: Queen's Printer, 1964, p. 192.

⁵ Royal Commission on Health Services, *op. cit.*, p. 878.

Expenditure being paid out for health services. It is looked upon either as a consumption expenditure necessary to provide the basis for the general well-being of the people, or an investment in future gains — not only economic but also social, political and moral.¹ The ultimate aim of the economy is to fulfil human wants just as all activities of organized society are aimed at the protection of its members and furtherance of their well-being. From this point of view, the economic objective of health expenditures is achieved if adequate or the best possible health services are provided.² Healthy people are, however, both object and subject of economic as of any other social action, “ends in themselves and instruments of production”.³ Thus, while health expenditures contain a definite investment element, they cannot be entirely evaluated from this point of view. The fact, for instance, brought out in the previous chapter, that some 20 per cent of the cost of personal health services goes to people aged 65 and over, indicates the substantial portion of health services devoted to people who will not be productive to any large extent in the economic sense of the word. To this we may add the services provided to the about 60,000 people who die annually before reaching retirement age and to those who are permanently too disabled to contribute to the economy. We may say, therefore, that in our civilization health services are provided to relieve the suffering from illness and to extend the life span to be enjoyed by the individual as well as by those who would suffer bereavement by a premature death.⁴ If, in many respects, it also pays in dollars and cents, as indeed it does, to maintain health and reduce illness, so much the better. The cost of maintaining an optimum of health, however, and the economic benefits derived from it can be measured only roughly and partially.

COST OF HEALTH SERVICES AND THEIR ECONOMIC BENEFITS

A conclusive cost-benefit analysis of health services would be extremely difficult. To determine the cost of health services poses little conceptual difficulty but many practical problems of obtaining the necessary data, especially if we are interested in health services in the widest sense, including not only personal services but also public health services, education of health personnel, and research. Our problem is to delineate what should be included under health services.

In assessing the economic benefits, on the other hand, there are in addition to the practical problem of the availability of data a number of conceptual problems to be solved. One of the difficulties lies in determining the economic value of the human resource in a capital-intensive and labour-saving economy.

¹ Brown, T.M., *op. cit.*, p. 192.

² Health as such is the objective of health services which will be evaluated primarily in terms of their success in maintaining or restoring health. But health services do not necessarily promote better health; often they only alleviate the symptoms of ill health such as pain.

³ Pigou, A.G., *The Economics of Welfare*, Part I, Chapter 1.

⁴ cf.: “The final test of an economic system is not the tons of iron, tanks of oil, or miles of textiles it produces: the final test lies in the ultimate products — the sort of men and women it nurtures, and the order and beauty and sanity of their communities.” — Mumford, L., *Faith for Living*.

If we see the economic benefits of better health in reduced illness-absenteeism and increased working-life-time of the members of the labour force, we must bear in mind that the degree or quality of health, or the absence of illness, is not only the result of the health services proper. Chapter 2 contains a description of some of the factors which have a direct or indirect effect on human health but which would not be included by any stretch of the imagination under the health services to whose costs the economic benefits are to be related. Better nutrition, more adequate clothing and housing, physical and mental recreation, the extent of air and water pollution regulated by industrial devices, all affect the health and hence the productivity of the people. Cost estimates of health services do not include expenditures for drugs not prescribed by a physician, or such borderline goods as vitamin pills. Nor do they include health-oriented food additives such as iodine in salt and vitamins in other food products. Improved food handling and processing, as well as other measures adding to general hygiene and sanitation also contribute to improved health while other environmental factors mentioned in Chapter 2 may be responsible for a deterioration of health despite the continued effective functioning of the health services. In this situation we would have to ask, how much worse would things be had it not been for the existing health services. We may, on the one hand, experience more sickness absenteeism for the purpose of obtaining health care and thus a reduction in productive time but, on the other hand, the better care may contribute to a lengthening of the life span. A lengthening of the average life span, however, is no longer an economic benefit as long as we cut off the working life at age 65 in any case.

Having mentioned the capital-intensive character of our economy, it should not be forgotten that this has not always been so and that only decades ago the position of human capital was quite different, particularly in certain industries such as agriculture. The same applies to countries at different stages of economic development which are labour-intensive and where such measures as, for instance, the eradication of malaria or other diseases has a very direct and substantial effect on a country's productive capacity.¹ In the same situation, the saving of lives by improved health services, such as the reduction of a high infant mortality rate, may add to the economic difficulties by increasing population pressure.

Effective health services have a definite feed-back effect. Not only may one type of care eliminate the need for others but early treatment of some kind may obviate the need for more of the same kind later on. It is obvious that successful prevention eliminates the need for treatment and rehabilitation; but early treatment, such as certain surgery, may save more complex surgery of the same type later on. Conversely, diagnosis will initiate treatment, treatment in turn lead to rehabilitation and follow up, all with their varying effects on the health of the individual.

¹ See Winslow, C.E.A., *The Cost of Sickness and the Price of Health*, Geneva: World Health Organization 1951.

Total expenditures on health services are estimated by Madden to have amounted to \$1,812,900,000 in Canada in 1961.¹ A good deal of detail regarding these expenditures, including projections until 1991, will be found in the study quoted as well as in the Report of the Royal Commission on Health Services. The total figure is quoted here in order to provide the proper perspective for other economic considerations.

Among the economic benefits of health services mentioned by the Royal Commission on Health Services are some important ones not directly related to health improvements resulting from the services. The Commission refers to the substantial contribution of the health industry to the absorption of Canada's growing labour force.² It points out that between 1931 and 1961, employment in the health sector rose from 68,000 to 281,000, an average annual increase of 6 per cent compared with a 2.2 per cent increase in the total labour force.³ It should be noted in this connection that the increase in the health labour force means not only more personnel in the traditional health professions but also the emergence of a host of new professions and new specialties in the old ones.

Among the economic benefits of better health is the increased duration of working life. If, for the period from 1926 to 1963, we assume the working ages to lie between 15 and 65, we find that those dying in selected years have been in the labour force, or available to it, on the average for the number of years shown:⁴

| Year | Average Years in Labour Force | |
|------|-------------------------------|-------|
| | Men | Women |
| 1926 | 25.0 | 26.9 |
| 1936 | 34.4 | 35.5 |
| 1946 | 38.1 | 39.8 |
| 1956 | 43.0 | 45.6 |
| 1961 | 44.7 | 48.1 |
| 1962 | 44.9 | 48.2 |
| 1963 | 45.5 | 49.1 |

Thus, people reaching the end of their lives now will have had about 20 years more in the labour force than those who died in 1926. Applied to today's labour force of about 4.9 million men and 1.9 million women, it means that these people

¹ Madden, J.J., *Economics of Health*, study prepared for the Royal Commission on Health Services. Ottawa: Queen's Printer; also contained in *Royal Commission on Health Services*, Vol. I, Ottawa: Queen's Printer, 1964, p. 792. (The total includes expenditures on personal health services, prescribed drugs, general and public health services, construction of hospitals, medical, dental and nursing schools, and other public health capital and health research.)

² Royal Commission on Health Services, *op. cit.*, pp. 496-499.

³ *Ibid.*, p. 497.

⁴ Based on average ages of decedents as in Dominion Bureau of Statistics, *Vital Statistics*, Ottawa: Queen's Printer, various years (1926 is the first year for which vital statistics for all provinces are available).

in their lifetime will have had 142 million working years more than they would have had with the shorter life span of forty years ago. For the one year from 1962 to 1963 alone, the corresponding gain is almost 5 million (465 million) working years. The years added at the end of the working life span also mean increasing proportions of disability, and the increase is partly due to environmental circumstances. Some of these are only remotely related to health services such as health education whose function it is to stimulate the application of the findings of health research by the individual and the family in daily life. The reduction in infant mortality or tuberculosis is an example of this. Much of this reduction is due to the health services proper but much is also due to the application in daily living of principles which can be traced back to research findings. To that extent it may be said that health services, including research, have brought about these reductions.¹

Setting the upper limit for the working life period at age 65, if at all realistic under present conditions, certainly means that we are wasting, economically speaking, any further extension of the life span. The mean age at death is closely approaching this limit. Both the median age at death and life expectancy at birth are already at points several years past the usual retirement age. Unless we revise retirement practices and legislation, no further economic benefit will result from the expected future increase in the life span.

Another approach demonstrating the economics of health services is to relate the direct cost of services to the so-called indirect cost of illness and premature death. Indirect costs are those resulting from inability of those disabled by illness, either temporarily or permanently, to participate in the productive process and the occasioning of welfare expenditures for the disabled and his dependents. The relationship between health and welfare, illness and poverty, will be discussed later in this chapter.

One very crude estimate is that in Canada in 1961 the money value of productivity lost due to disabling illness was of the order of \$1,400 million for physical illness, and \$176 million for mental illness, a total of \$1,576 million.²

In addition, there is the loss to the labour force by those who would have been alive and of labour force age had they not died prematurely since 1926.³ Their number is estimated to be about 1.2 million.⁴ Of these, about 700,000 would have been employed,⁵ and they would have made the same contribution to the productive process as measured for the other groups by the mean earned

¹ See, for instance, National Health Education Committee, Inc., *Does Medical Research Pay Off?*, New York: The Committee, 1963.

² For derivation of estimates see Appendix 3.

³ The year from which vital statistics are available.

⁴ Based on the number of deaths occurring in Canada from 1926 to 1961 among people who, had they not died prematurely, would have been aged between 15 and 65 in 1961.

⁵ Same proportion as those of the same ages living and employed in 1961.

income (i.e., \$3,739). Following the practice adopted by economists in dealing with such estimates, we should, in the case of the deceased, determine the net value of their contribution, i.e., deduct their maintenance cost or consumption expenditures.¹ On the other hand, one should take into consideration that the withdrawal as consumers of the prematurely dying means a shrinking market for the economy, offsetting some of the savings in maintenance cost. Assuming that the resulting net productive contribution consist of the above mentioned \$3,739 per capita less personal expenditure on consumer goods and services, there remains at net amount the sum of personal net saving and personal direct taxes distributed among the gainfully employed. This amounts to about \$630 per capita² or for the 700,000 prematurely withdrawn from the labour force, a total of about \$440 million.

In all then, the loss of economic production due to disability from physical and mental illness, and premature death would have been of the following order in 1961:

| | Loss (\$000,000) |
|------------------|---------------------|
| Physical illness | 1,400 |
| Mental illness | 176 |
| Premature death | <u>440</u> |
| Total | 2,016 |

It should be remembered that the figures can at best be taken as indicating the approximate order of size of the economic loss, and economic loss only, due to illness and premature death.

If we accept the above as a valid approximation, it indicates that the cost of lost production is somewhat higher than the \$1,800 million annual cost of health services. It could be said then that the total economic cost of ill health is more than double the direct cost of services in any one year. Although the argument for good health services is not that they pay off in terms of dollars and cents, it is good to know that any reduction of disability and premature death would bring about measurable economic returns.

Corresponding computations could be carried out for specific diseases or groups of diseases where the necessary data are available.

Apart from the methods used, the applicability of the reasoning behind determining lost productivity may also be questioned and must be qualified in accordance with a particular state of the economy as well as of social institutions. Under conditions of full employment, each day lost by a member or potential member of the labour force means a reduction in output. If there is unemployment,

¹ See Weisbrod, B.A., *Economics of Public Health*, Philadelphia: University of Philadelphia Press 1961; and references listed in Royal Commission on Health Services, op. cit., p. 506.

² Based on Dominion Bureau of Statistics, *National Accounts, Income and Expenditure 1947-1961*, Ottawa: Queen's Printer, 1962, p. 57.

we must ask ourselves whether eliminating the 2 per cent of working time lost due to illness would not just add to the existing unemployment or, in other words, whether it is not part of the existing unemployment situation. If unemployment is structural, one could not assume that the employed who are sick could not be replaced from the ranks of the unemployed and disability among the employed will constitute a real loss. One would also have to take into account the duration of disability and the type of work of the disabled; short absences will represent different problems from long absences in regard to replacement and the possibility of replacement will also depend on the kind of work performed.

The loss estimates presented here attempt to show the current loss incurred in one year. This is different in the case of premature mortality from the actuarial computations determining the net worth of future earnings of persons dying at various ages. Examples of the latter type of computations are contained in the Report of the Royal Commission on Health Services; they show for selected causes the estimated present value of lost net production resulting from deaths in Canada in 1960:¹

| | Value (\$000,000) |
|------------------------------------|----------------------|
| Cancer | 118 |
| Diseases of the circulatory system | 168 |
| Accidents | 130 |

Interpreting these various estimates of costs and economic benefits (reductions in the indirect costs would be among the benefits), one must always keep in mind that it is not a question of attaching dollar values to life or health. "One shudders a bit at the very thought of an economic evaluation of life;"² these are the words with which Dublin introduces his investigation of the economic aspects of human life. There is no denying, however, that some aspects – but only some aspects – do have economic connotations; they are the goods and services produced by a person measured by the money he earns – or could have earned had nothing interfered with his activity. The money value of that part of a man's life has been assessed since early days when a price was set on a slave, or when in ancient law the wergild represented the value set upon a man's life along a scale ranging from churl to king. According to the Salic Law the sentence for killing a person ranged from 62 shillings for a Roman obliged to pay tribute, 100 shillings for a Roman not being a landed proprietor and table companion of the king, 200 shillings for a free Frank, 300 shillings for a Roman who eats at the king's palace, to 600 shillings for a man in the service of the king.³ Sir William Petty undertook to show the indirect cost caused by the plague, war losses and by the sending abroad of people into the service of foreign princes. He computed "the value of every head, one with another; and that by the instance of the people in

¹ Royal Commission on Health Services, *op. cit.*, pp. 511–513.

² Dublin, L.I., *Health and Wealth*, New York: Harper and Brothers, 1928, p. 1.

³ Title XLI (Thompson, J.W., *The Middle Ages*, New York, 1931.)

England". He arrived at a sum of £80 sterling as "the value of each head of man, woman and child; and of adult persons twice as much."¹ He stated the basic principle of life-table based on actuarial computations: "The numbers of people that are of every yeare old from one to 100, and the number of them that dye at every such yeare's age, do shew to how many yeare's value the life of any person of any age is equivalent and consequently makes a Par between the value of Estates for life and for years".² Eventually the need arose for legal and insurance purposes to determine the net value of deceased persons' potential or likely future earnings. William Farr did this by applying actuarial methods.³ Dublin and Lotka⁴ refined these and applied them to the modern situation in the United States. They have since been brought up to date and applied to more specific problems by Weisbrod⁵ and others.

The rapidly increasing cost and complexity of health services due to scientific advances and the growing use being made of them, has generated an equally growing concern with the economic aspects of health and health services not only by health workers but also by economists and public administrators generally. Economic considerations thus cannot fail to enter into the planning and evaluation of health services and operational research. A study of the economics of mental illness in the United States begins with these three questions: (1) how much does mental illness cost? (2) how much would it cost to provide the highest possible standard of care? and (3) can we afford these costs?⁶

It may well be that greater health consciousness, earlier attention to milder manifestations of illness, and the availability of new diagnostic and treatment methods increase the amount of temporary disability and absence from work although long-term benefits in longer life expectancy may result. These may no longer constitute economic benefits but they would nevertheless prove the effectiveness of health services.

The applicability of all these economic considerations will depend not only on the relative role of labour versus capital and the extent and type of unemployment, but also on the way social adjustments are made to increasing productivity by the shortening of work hours, extending leave periods, extending school-leaving age, and adjusting the retirement age.

It is understandable that a United Nations report dealing with social planning for developing economics should require health survey data indicating not only changes in morbidity and mortality as such but also data indicative of "indirect effects affording evidence of raised productivity" due to the eradication of certain

¹ Petty, W., *Political Arithmetic*, Ch. I, London, 1691.

² The Petty Papers, 1, 193, as quoted in Greenwood, M., "Medical Statistics from Graunt to Farr", *Biometrika*, Oct. 1941, pp. 115 and 116.

³ Farr, W., *Vital Statistics*, London: E. Stanford, 1885, pp. 531-537.

⁴ Dublin, L.I., Lotka, A.J., *The Money Value of a Man*, New York: Ronald Press Co., 1946.

⁵ Weisbrod, B.A., *op. cit.*

⁶ Fein R., *Economics of Mental Illness*, Joint Commission on Mental Illness and Health, Monograph Series No. 2, New York: Basic Books, Inc., 1959.

diseases; such indicators should be "capable of indicating the directions in which health activities can make a measurable contribution to economic investment and to overall development goals".¹ As the economy develops, however, the goals will increasingly include returns of a general social nature without regard to their economic investment function.

In keeping close watch on the high cost of health services and in considering definite economic returns from improved health,² it must be remembered that the best possible health services often have to be, and actually are, provided without economic returns or with a definite loss. We must recognize "that the results which we seek are not all translatable into dollar amounts, and that some of the results which we achieve can be thus translated but nevertheless spell a *loss* in dollars - and yet our consensus of ethical judgment is that we should proceed in any way".³ It is well to keep in mind that the first modern standard work dealing with the money value of man developed out of the needs of the life insurance business to aid in answering the question, how much insurance a family man should carry.⁴ The methods developed by the authors are admirably suited to serve this purpose. But the authors are also well aware of the limitations when they point at the difficulties of estimating the *social* loss due to illness and death:

"The fact, of course, is that we need no argument based on alleged economic grounds to urge us in the endeavor to prevent as far as possible direct and indirect human suffering resulting from defect, sickness, and death. The normal man is naturally possessed of sufficiently powerful instincts of altruism to urge him to right action in these matters, without economic coercion, and, in fact, where necessary, at an economic sacrifice."⁵

HEALTH AND POVERTY

Returning from the discussion of economic costs and benefits to the wider area of social factors related to health, we are dealing again with two concepts - health and social factors - which are difficult to define or separate, and still more difficult to quantify. And here again, pending further investigation, we shall have to fall back on dealing with factors that can be measured, i.e., illness instead of health and economic status as indicative of the social condition. Throughout this study attention has been directed to known and suspected relationships between health and social and environmental factors generally. In this chapter the emphasis will be narrowed to reviewing health and social condition largely in the more concrete terms of illness and poverty. But it must be borne in

¹ United Nations, "Problems of Social Development Planning", Development Programming Techniques Series No. 4, New York 1964, p. 31 (the report refers especially to Asia and the Far East and emphasizes communicable disease control).

² The most direct returns are perhaps those observed among patients after effective rehabilitation procedures.

³ Linnenberg, C.C., "How Shall We Measure Economic Benefits from Public Health Services?", Economic Benefits from Public Health Services, Public Health Service Publication No. 1178, Washington: U.S. Government Printing Office 1964, p. 1.

⁴ Dublin, L.I., Lotka, A.J., op. cit., p. VII.

⁵ Ibid., p. 87.

mind that the quantifiable aspects and results of illness are only part of the impact exerted by health or disease on the condition of the people. Prolonged sickness in the family or severe and permanent handicaps, physical or mental, make demands on the stability of the family far beyond the purely economic ones. This becomes an important and very practical consideration in weighing the advantage that home care may have in some cases in preference to institutional care. There will be cases where the former would seem advantageous for the patient and cheaper, but impose undue strain on the family.

Dealing with a severely handicapped child, for instance, and integrating him into the family and community to the greatest possible extent creates many problems for the parents, no matter how attached they may be to the child. The parents need information (education) as well as practical help. One parent education programme identifies the following problem areas in such situations: (1) the birth of a handicapped infant precipitates a family crisis (the same is true of a handicap occurring later in the child's life); (2) lack of communication between parents and health professionals; (3) great extent of parental misinformation; (4) feeling of inadequacy on the part of parents; (5) understimulation of the child; (6) limitation in the physician's resources of time and services required.¹ Much of this is applicable generally to the care of the handicapped in the home. The Report of the Royal Commission on Health Services emphasizes in regard to the care of mentally retarded children the need for assistance to the parents to relieve them of some of the strain.²

The effects of bereavement also transcend the purely economic ones of losing the wage earner. In discussing the effects of bereavement, the Canadian Medical Association Journal ends an editorial on the subject by stating that the "full classification of the influence of grief upon somatic illness awaits further study", but it does refer to specific findings regarding a sharp rise in mortality among bereaved spouses during the first six months of widowhood and the increase in psychiatric and non-psychiatric consultations particularly in the early stages of widowhood.³ It is clearly a matter for education and religion to shape cultural and spiritual attitudes and values in a way so as to achieve the best possible balance between the lust and reverence for life on the one hand, and reconciliation to death on the other.⁴

Surprisingly little research has been done on the relationship between health and poverty beyond establishing vaguely that relationships do exist. Canada in particular has been lagging behind in defining and classifying the social condition

¹ Green, M., Durocher, M.A., "Improving Parent Care of Handicapped Children", *Children*, September - October 1965, pp. 185 and 186.

² Royal Commission on Health Services, *op. cit.*, Recommendation 12, p. 24.

³ "Effects of Bereavement", editorial, *Canadian Medical Association Journal*, September 19, 1964, p. 668.

⁴ Regarding the impact of death on survivors, see for instance Davis, F., *Passage through Crisis*, Indianapolis: Bobbs' Merrill, 1963; and Glaser, B.G., Strauss, A.L., "Temporal Aspects of Dying as a Non-scheduled Status Passage", *American Journal of Sociology*, July 1965, pp. 48-59.

of people or of geographical areas in a way that could be related to health conditions. Census tracts and economic areas are a beginning towards a social classification of regions. The basis for a corresponding classification of people has been provided in Canada by Blishen¹ but unfortunately such a classification is not generally used in existing statistical series. There are, of course, definite conceptual and practical limitations inherent in any such classification. Among them is the validity of occupational information but it would seem that nevertheless, while detailed differentials may not be always significant, broad patterns can be established as has been demonstrated extensively in the United Kingdom and in many research projects elsewhere.

With more and better data on such characteristics as income and schooling becoming available, the social classification can be refined.² Where a meaningful social classification of areas is available, it is a matter of reconciling the delineation of these areas with those for which health statistics can be obtained. Until data on social stratification become more widely available and used, we have to rely on what scanty information we have regarding the economic status of people as reflected by their income.

When Langland spoke of poverty as the "moder of healthe",³ he referred to the simple and rustic life which later generations yearned for as Rousseau's state of the noble savage. Then, as poverty shifted to the cities, particularly in the wake of the industrial revolution, it created the conditions described by Chadwick in his report on the sanitary condition of the labouring population of Great Britain (1842), and by Shattuck in his commission's sanitary survey of Massachusetts (1850). Both reports, written in the mid-19th century, had as their chief authors men who were not health workers but whose attention was drawn to the health problems of their communities as a result of their concern with social conditions in general.

Reference has been made to social and environmental factors affecting the health of Canada's indigenous people. If poor health conditions were found to exist among these people, it is interesting to note their social status:

"Native Indians and Eskimos are concentrated in the lowest class - nearly 72 per cent. In fact, over 96.0 per cent of our native population is concentrated in the three lowest classes. Apparently the social mobility of individuals in this group within the context of Canadian society is less than that of any other group."⁴

In this case, it can be assumed that the low status - resulting in poor housing, nutrition, and sanitation - causes poor health, which creates apathy, lethargy, and frustration, affecting in turn the social condition.

¹ Blishen, B.R., "The Construction and Use of an Occupational Class Scale", *Canadian Journal of Economics and Political Science*, November 1958, pp. 519-531.

² The term "class" often used for the resulting social groupings has unfortunate connotations of rigidity in the social structure, but a better term could certainly be found. Titmuss observes that "Social Status" and "Economic Status", regrettable though it may seem, appear to be interchangeable. Titmuss, R.N., *Birth, Poverty and Wealth*, London: 1943, p. 25.

³ Langland, W., *Piers Plowman*, XIV, 298.

⁴ Blishen, B.R., *op. cit.*, p. 524.

Much more study is needed to determine in what way the association between poverty and illness is a cause-and-effect relationship. A study of the association of health and welfare problems among some Pittsburgh families found: (1) an association of health and social problems in individuals; (2) social problems in one of the family members accompanied by a social problem in other family members, and the same being true also of health problems; and (3) factors affecting jointly both the clustering in families of sick persons and persons with social problems. The study calls for further research into the mechanisms which produce these associations.¹

The Canadian Sickness Survey 1950–51 estimated the distribution of disability days among members of different income groups as follows:²

Disability Days per Person per Year

| Age Group | Low Income | Medium Income | High Income | |
|-------------------|------------|---------------|-------------|-------------------|
| | | | Lower | Upper |
| - 15 | 10.3 | 10.4 | 10.6 | 10.6 |
| 15 - 24 | 11.7 | 7.5 | 6.9 | 8.9 |
| 25 - 44 | 16.6 | 8.8 | 7.0 | 7.3 |
| 45 - 64 | 28.5 | 14.1 | 11.1 | 9.8 |
| 65 and over | 33.5 | 21.7 | 16.4 | 37.8 ¹ |
| All ages | 20.4 | 10.6 | 9.1 | 10.1 |

¹ Estimate below Sickness Survey Standard of Accuracy.

Similar patterns prevail in the United States.³

There is a marked difference between the low income group on the one hand, and the three higher income groups on the other. The relative over-all experience of the medium and high income groups is difficult to interpret because the high figure for the 65 and over group in the upper high income bracket is not necessarily accurate. It appears, however, that any trend that exists of declining illness and disability with increasing income is less pronounced than that observed for the low income group. This also is borne out by the National Health Survey in the United States and by studies carried out among selected population groups.⁴

The United States National Health Survey offers this explanation for the higher rate in the lower income groups:

¹ Hrubec, Z., "The Association of Health and Social Welfare Problems in Individuals and Their Families", Milbank Memorial Fund Quarterly, July 1959, pp. 270 and 272.

² Dominion Bureau of Statistics and Department of National Health and Welfare, Canadian Sickness Survey 1950–51, No. 9: Volume of Health Care for Selected Income Groups (National Estimate), Ottawa: Queen's Printer, 1956, p. 62, (the corresponding incomes were in 1950–51: low – under \$1,500; medium – \$1,500 – \$2,999; high, lower – \$3,000 – \$4,999; high, upper – \$5,000 and over).

³ Public Health Service, Disability Days – United States – July 1961 – June 1962, National Centre of Health Statistics, Series 10, No. 4, Washington: U.S. Government Printing Office 1963, p. 11.

⁴ Laughton, K.B., et al., "Socio-Economic Status and Illness", Milbank Memorial Quarterly, January 1958, pp. 46–57.

"A possible explanation for this relationship is that persons in lower income families are more subject to restricting illness because of less utilization of medical care, poorer diet, and other factors. It is also possible that families in which there is restricting illness have lower incomes as a result of this illness. Persons who otherwise would be employed might not seek or be able to secure employment because of ill health. And those persons who are employed might tend to work less or take poorer paying jobs because of health problems".¹

The United Kingdom publishes every ten years statistics on occupational mortality. In referring to these figures, the Ministry of Health commented in its 1957 annual report:

"It is stressed.....that high mortality rates do not necessarily reflect the risks of a particular occupation. Often it is the socio-environmental circumstances, the geographical location, and the attitude of the individuals towards healthy living that play as great, if not the greater part in determination of mortality risks. In recent years attention has moved from the consideration of the risk of a particular occupation more to the broader study, of the effect of 'social class' and 'socio-economic group' on mortality."²

The five "classes" used in the United Kingdom are based on occupation, as follows: I – Professional occupations; II – Managerial occupations and employers; III – Skilled occupations; IV – Semi-skilled occupations; V – Unskilled occupations. An analysis of the data shows, for instance, that infant mortality increases steadily from class I to class V.³ The general mortality pattern has been changing over the years. In the period 1930–1932 there was a steady increase in mortality from class I to class V. By 1949–53 the relative position of class II had improved considerably, social class I had slightly worsened, while class V remained with the least favourable mortality. Among the main contributing factors seemed to be the increase in mortality from coronary artery disease and from vascular lesions in the professional occupations.⁴ It is very likely that mortality in Canada follows similar patterns but there is little statistical evidence. All indications are that what the economist Alfred Marshall said of the poor, still applies:

"Their poverty is great and almost unmixed evil to them. Even when they are well, their weariness often amounts to pain, while their pleasures are few: and when sickness comes, the suffering caused by poverty increases tenfold."⁵

Having established that the people who are falling behind fall into four classes, of which those with physical and mental deficiency constitute one,⁶ Galbraith

¹ U.S. Public Health Service, "Disability Days, United States July 1957 – June 1958", Health Statistics from the U.S. National Health Survey, Series B-10, Washington: Department of Health, Education, and Welfare, 1959, p. 6.

² Report of the Ministry of Health for the Year 1957, Part II, London: Her Majesty's Stationery Office 1958, p. 33.

³ Ibid., p. 34.

⁴ Ibid., pp. 33 and 34.

⁵ Marshall, A., Principles of Economics, London: Macmillan 1898, Bk. 1, p. 2.

⁶ The others are: those with poor education, those who live in the wrong geographic area, and combinations of the three factors.

stresses that in this our affluent society "much can be done to treat those characteristics which cause people to reject or be rejected by the modern industrial society",¹ and physical and mental handicaps can be remedied or treated.

That ill health and poverty are bedfellows, is true in the life of nations as well as in that of individuals and families:

"Historically, the healthiest nations have been those with the highest incomes and the lowest illiteracy rates. At the beginning of this century life expectancy at birth was greater in the United States, Great Britain, and the Scandinavian countries than it is today in many parts of the world. Yet, as late as 1955, India had the same life expectancy at birth, 35 years, as existed in Massachusetts and New Hampshire in 1789...."²

Since we in Canada are fortunate enough to be counted among the affluent societies, it is important to be aware of the relationship between poverty and ill health in North America generally and in this country specifically.

It would go beyond the scope of this study to define poverty and its extent in Canada. There are many studies under way now doing just that in connection with the various programmes directed at poverty. It may suffice here to describe rather than define the poor as those "who are denied the minimal levels of health, housing, food and education that our present state of technological and scientific knowledge specifies for life as it is lived in this country".³ Estimates of their number in terms of income can yield gross approximations only because income must be assessed against the circumstances and responsibilities of the recipient. This relates not only to assets and family responsibilities but also to such factors as the stage of the career; someone just establishing himself in business or a professional career may have little or no income but plenty of credit, and is likely to be at an age when health is usually at its best. The quoted description also indicates that the concept of poverty is relative and must be considered in the context of the general affluence of the particular society.

Depending on the definition, the poor may number around 3 or 4 million in Canada. The Royal Commission on Health Services estimated that between 10 and 14 million Canadians would have to be subsidized or means tested in 1961, because their ability to pay the full cost of a comprehensive health service programme was in doubt.⁴

How many of these several million of Canadians have health problems of a magnitude that renders it difficult to cope with them under poverty conditions, that aggravate their poverty, or perhaps caused it? Unfortunately, only very scanty statistics are available on this question although the information could be

¹ Galbraith, J.K., *The Affluent Society*, Boston: Houghton Mufflin Co., 1958, pp. 331 and 332.

² Pond, M.A., "Interrelationship of Poverty and Disease", *Public Health Reports*, November 1961, p. 967.

³ Ontario Federation of Labour, *Poverty in Ontario 1964*, Toronto: The Federation 1964, pp. 7 and 8.

⁴ Royal Commission on Health Services, *op. cit.*, p. 738.

obtained without much difficulty from the existing records of the recipients of categorical and other welfare programmes; an exception are those in receipt of disability or blindness allowances, for whom some data are available.

About 50 years ago it was stated that in the United States "the charitable organizations say that about one-fourth of the distress which manifests itself is caused by sickness".¹ The contemporary student of poverty still finds that "in every subculture of the other America, sickness and disease are the most important agencies of continuing misery".² The New York Times publishes each year around Christmas time a short case history of what are considered to be the hundred neediest cases in New York City. A review of these histories in selected years revealed the following percentages of the cases involving serious illness — physical or mental, including alcoholism: in 1956, 91 per cent; in 1962, 91 per cent; in 1964, 86 per cent.³ These are cases selected as being in extreme need.

Case studies of 100 low-income families in the United States, submitted to the Senate, revealed that illness in one way or another affected 70 of the 100 families studied, leading to the conclusion:

"Health remains the point of highest vulnerability. The defenses of low-income families are really down when sickness strikes and our common barriers against its onslaughts on health and livelihood are as yet painfully inadequate."⁴

Two examples, one based on provincial and the other municipal experience, illustrate that health problems form a substantial part also of the welfare cases in Canada.

The Ontario Department of Public Welfare shows major health problems as the reasons for aid to general welfare assistance recipients in the following percentages of cases in 1963:⁵

By sex: Male - 33.6%; female - 29.5%; both sexes - 32.0% . . .

By age: 0-39 years - 14.4%; 40-59 years - 44.6%; 60 and over - 53.4%;
all ages - 32.0%

In one-third of the cases, health problems were the direct reason for aid; more frequently among males than among females and rising with age, reaching over

¹ Hunter, R., *Poverty*, New York: Macmillan Co. 1905, p. 143.

² Harrington, M., *The Other America: Poverty in the United States*, N.Y.: Macmillan Co. 1962, p. 169.

³ The New York Times, December 9, 1956; December 9, 1962; December 6, 1964; pp. x — 4x in all issues.

⁴ U.S. Senate, 82D Congress, 2d Session, *Making Ends Meet on Less Than \$2,000 a Year (Case Studies of 100 Low-Income Families)*, a Communication to the Joint Committee on the Economic Report from the Conference Group of Nine National Voluntary Organizations Convened by the National Social Welfare Assembly, Washington: U.S. Government Printing Office, 1952, p. 3.

⁵ Ontario Department of Public Welfare, *Annual Report 1962-1963*, Toronto: Queen's Printer, p. 56, (Municipalities were responsible for 20% of payments under the General Welfare Assistance Act and were reimbursed by the Province at 80%. The Federal Government contributed 50% of this expenditure — Solely shared by the Province and Municipalities were the cost of the Medical Services, dental extraction or prosthetic appliances. — *ibid.*, p. 9).

50 per cent among the 60 years and over group. There were, in 1963, 38,118 heads of families and single individuals receiving general welfare assistance. With the 73,121 dependents, this amounts to a total of 111,239 persons being thus assisted, or 1.7 per cent of the total population.¹

Of the mothers' and dependent fathers' allowances approved in Ontario during the fiscal year 1962-63, about 39 per cent were due to the husband's unemployment. It may be assumed then, that of the beneficiaries under these schemes also about one-third were due to illness or disability.

Thus, it may be estimated that of the some 200,000 persons receiving direct assistance in that year in Ontario, more than 73,000 were in that category because of illness or disability.²

The causes given for these cases are not strictly comparable because of different classifications used in different programmes and also because some relate to the recipients and others to newly approved cases. Nevertheless, Table 60 will give some idea of the main conditions connected with economic dependency.³

Though it is not possible to summarize the data from the various programmes, it is clear that mental disorders, diseases of the circulatory system, and diseases of the nervous system and sense organs play a dominant role in the association of ill health and economic dependency. The fact that tuberculosis and poliomyelitis still appear in the table reminds us of the residual handicaps still in existence from these diseases.

A survey of multi-problem families in Ottawa resulted in what is referred to as "rather sketchy" information⁴ regarding the health of the 47 problem families investigated. The survey indicates that about 40 per cent of the men, 66 per cent of the women, and about 50 per cent of the children show a physical health status described as less than good. "Limited intelligence and mental and emotional ill health are fairly frequent characteristics of those families",⁵ and drinking also appears to be a serious difficulty" and is considered to be a severe problem in about one-third of the men.⁶

¹ Ibid., p. 54.

² Includes General Welfare Assistance, Rehabilitation Services, Blind and Disabled Persons Allowances, Mothers' and Dependent Fathers' Allowances, but the figure excludes the unknown proportion of 23,591 Old Age Assistance recipients who need the assistance because of illness (based on Ontario Department of Public Welfare, op. cit.).

³ Based on *ibid.*

⁴ Welfare Council of Ottawa, *Multi-Problem Families, A Survey of a Group of 47 Multi-Problem Families Known to Health and Welfare Agencies in Ottawa*, Ottawa: The Council (mimeographed) 1961, p. 21.

⁵ Ibid.

⁶ Ibid., p. 22.

TABLE 60
PERCENTAGE DISTRIBUTION OF ASSISTANCE CASES
DUE TO HEALTH REASONS,
BY CAUSE AND PROGRAMME, ONTARIO, 1962-63

| General Welfare Assistance | Rehabilitation Services | Blind and Disabled Persons' Allowances Combined | Mothers' and Dependent Fathers' Allowances | Per Cent of Cases |
|--|--|---|--|-------------------|
| Cause | Cause | Cause | Cause | Per Cent of Cases |
| 1. Diseases of Circulatory System | 1. Neuro-Psychiatric | 1. Mental Disorders | 1. Diseases of Heart and Blood Vessels | 28.3 |
| 2. Diseases of Bones and Organs of Movement — of these, Rheumatoid Arthritis, etc., 10.5% | 2. Impairments of Bones and Organs of Movement | 2. Diseases of Nervous System and Sense Organs | 2. Miscellaneous | 25.3 |
| 3. Mental, Psychoneurotic and Personality Disorders . . . | 3. Neurological | 3. Diseases of Heart and Blood Vessels | 3. Diseases of Bone and Joint | 11.2 |
| 4. Diseases of Respiratory System | 4. Tuberculosis | 4. Diseases of Bone and Joint | 4. Tuberculosis | 10.4 |
| 5. Diseases of Digestive System | 5. Seeing | 5. Neoplasms | 5. Mental Disorders | 8.4 |
| 6. Diseases of Nervous System and Sense Organs — of these, cerebral accidents 0.8% . . | 6. Miscellaneous | 6. Diseases of Nervous System and Sense Organs | 6. Diseases of | 7.8 |
| 7. Allergic, Endocrine, Metabolic and Nutritional Diseases — of these, Diabetes 2.8% | 7. Cardiovascular | 7. Diabetics and Complications | 7. Neoplasms | 7.7 |
| | 8. Amputations | 8. Poliomyelitis | 8. Diabetes and Complications | 2.2 |
| | 9. Hearing | 9. Accidents | 9. Poliomyelitis | 0.9 |
| | 10. Respiratory | 10. Congenital Malformations | 10. Accidents | 0.4 |
| | | 11. Tuberculosis | | |

| | | | | | |
|--|-------|-------|-------|-------|-------|
| 8. Accidents | 4.3 | | | | |
| 9. Infective and Parasitic Diseases — of these, Tuberculosis 2.9% Poliomyelitis 0.4% | 3.5 | | | | |
| 10. Ill-defined Symptoms | 3.4 | | | | |
| 11. Maternity and Complications . . . | 2.9 | | | | |
| 12. Diseases of Genito-urinary System . . . | 2.4 | | | | |
| 13. Diseases of Blood and Blood-forming Organs | 1.3 | | | | |
| 14. Neoplasms | 1.2 | | | | |
| 15. Diseases of Skin and Cellular Tissue | 0.7 | | | | |
| 16. Congenital Malformations | 0.3 | | | | |
| Total | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

Source: Based on Ontario Department of Public Welfare, Annual Report 1962-63, Toronto: Queen's Printer, pp. 57, 79, 90, 95, 99.

In the Vancouver area, 43 per cent of 1,407 multi-problem families were considered to have a health problem.¹ From a similar survey in London, Ontario, only preliminary information is available which indicates that in 62.5 per cent of the families accepted for study, ill health was associated with dependency.²

These examples will suffice to show clearly the close relationship and interdependence of health and welfare, illness and poverty. It would be a mistake, however, to assume that merely to eliminate the one economic problem of the cost of health services would solve the health problems:

"In an affluent society, where material wealth and economic gains are widely diffused, the relations of individuals to health values, resources and practices and to the acquisition, communication, and development of disease seem increasingly to focus medical attention upon cultural, -social, and psychological 'impoverishment', rather than only upon economic poverty."³

It is obvious that often those who need it most are not reached by the various means of health education which may guide their personal behaviour in health matters and familiarize them with the available means for preventive services and treatment facilities.⁴

To state that a close association exists between health and welfare, illness and poverty is helpful only if it leads to remedial action. What then are the conclusions?

One is that health, welfare, and other community services must be closely coordinated. This does not necessarily mean that they should be under one roof. The provision of actual services, like health care, functions differently from such welfare programmes as income maintenance schemes; furthermore, the increasing scope of public involvement by official and voluntary agencies on the health as well as the welfare side is bound to lead to administrative and budgetary separation of these services. What is necessary, however, is the realization on both sides of the common objectives. On the health side it means greater concern with the social aspects of medicine by the private practitioner as well as by the public health agency: "we should encourage and participate in more studies of the relationship of public health to other aspects of life and ecology - economy, culture, purchasing patterns, communications, and agriculture, to mention but a few".⁵ This statement

¹ Community Chest and Councils of the Greater Vancouver Area, Proposal for an Area Demonstration Project, Vancouver: The Chest 1962, p. 21.

² Personal communication from A.M. Moore, Project Director, The London Family-Centred Project, United Community Services, London, Ontario.

³ Stainbrook, E., "Man and His Changing Environment - Health and Disease and the Changing Social and Cultural Environment of Man", American Journal of Public Health, July 1961, p. 1008.

⁴ See e.g., Cornely, P.B., Bigman, S.K., "Acquaintance with Municipal Government Health Services in a Low-Income Urban Population", American Journal of Public Health, November 1962, p. 1886; Pond, M.A., op. cit., p. 973; and Olendzki, M., et al., "The Significance of Welfare Status in the Care of Indigent Patients", American Journal of Public Health, October 1963, pp. 1683 and 1684.

⁵ Hanlon, J.J., "The Public Health Worker and the Population Question", American Journal of Public Health, November 1956, p. 1404.

was made in regard to health measures in developing countries where reduced infant mortality and the control of infectious diseases have added to the population pressure; it applies, however, no less to the micro-cosmos of the Canadian "problem" family where more effective health measures must also go hand in hand with family planning and raising of the general level of living in order to bring to these families some of the benefits already enjoyed by the "normal" family.

Within the framework of closely coordinated - even if administratively separate - community services, there are three categories of specific measures which will go a long way in breaking the "deadly spiral" of sickness and poverty:¹

- 1) removal of the financial barriers to the access to adequate health services;
- 2) income maintenance during temporary and permanent disability;
- 3) intensified rehabilitation regardless of age and labour force status, and occupational opportunities for the handicapped;
- 4) practical assistance to those caring for chronically ill and handicapped persons in their homes.

Regarding the first of these items, emphasis must be not just on token services but adequate care. Just to allow, for instance, extractions as dental services for welfare recipients is not adequate dental care.

The question of income maintenance has been solved only partially in Canada by the Blind Persons Act of 1951 and the Disabled Persons Act of 1954, providing for allowances to blind and otherwise permanently and totally disabled persons, subject to a means test. No universal scheme exists in Canada for the provision of "sickness benefits" for temporary disability among those participating in the labour force. Such arrangements as do exist are individual insurance contracts or group contracts covering mainly some employees in industry. Besides, some industries have formal provisions for paid sick leave, while others may continue to pay their employees in full or in part for some periods of sickness but without any formal commitment to do so. Little is known of these various arrangements which would permit an assessment of their adequacy. The Labour Department's survey of working conditions for 1963 shows that of establishments with at least 15 employees, some 80 per cent reported sick leave provisions (82 per cent for non-office, 83 per cent for office employees). The industries included in the survey have some 2 million employees, i.e., less than one-third of those actively employed in the labour force. No information is given of the amount or duration of sick leave pay but a substantial number of plans have waiting periods of various duration before pay commences.² Cash benefits during temporary sickness disability are a feature of the social security structure in many countries, including some states of the United States;³ such benefits may be administered along the patterns of, or

¹ Horwitz, A., *On Health and Wealth*, Washington: Pan American Health Organization, 1960.

² Department of Labour, *Working Conditions in Canadian Industry 1963*, Ottawa: Queen's Printer, 1964, pp. 70 and 71, 168 and 169.

³ Sickness benefits are in effect in all European countries, all but 6 American countries, 5 Middle East countries, 8 countries in Asia and Oceania, and 6 countries in Africa (U.S. Department of Health, Education, and Welfare, *Social Security Programs Throughout the World 1964*, Washington: U.S. Government Printing Office 1964, pp. XVII and XVIII).

jointly with, unemployment insurance or workmen's compensation programmes. A similar programme was under study in Canada about 15 years ago but nothing came of it.

It would be timely to supplement the work done by the Royal Commission on Health Services regarding the provision of health services by a study of sickness cash benefits during disability. In view of the many recent changes in Canada's social security programmes, it may even be timely to have a Royal Commission or similar body to study the whole system - or lack of a system - of social security and welfare services in Canada.

Matters of rehabilitation services and their organization are discussed in the Report of the Royal Commission on Health Services which recommended a broadening of the Vocational Rehabilitation of Disabled Persons Act of 1961.¹ Also needed, however, is wider acceptance and application of modern rehabilitation methods and more effective ways for employing the handicapped.

Practical assistance to those caring for sick or handicapped family members at home is an important adjunct of the recent emphasis on care in the home and community instead of in institutions. The need for this kind of assistance is particularly evident in the case of handicapped children but it applies equally to those who care for elderly relatives or family members of any age who are physically or mentally handicapped.

SUMMARY

Social aspects of health and illness have been in evidence throughout this study. This is only natural in view of the fact, noted at the very beginning, that health is if not synonymous with social well-being, at least a very substantial part of it. Among the clearly economic aspects of health are the expenditures for health services. The health of the people, however, is more and more becoming an end in itself rather than an economic attribute of the human resource in the economy. Although the latter is still a real factor which must be taken into account in economic considerations, it is so to a lesser extent than it was in Canada when the economy was more labour intensive, as it still is in many other parts of the world. Economic considerations are important not only to the economist but also to the health worker in that they can play a part in determining objectives and priorities - to the extent that such priorities are actually necessary in an affluent society. Once a society has reached this fortunate state, the economic returns cease to be the only or even main criteria for evaluating health services. The economic question here is no longer whether "it pays" to have a certain kind of health care but whether we "can afford" to have it. Any incidental economic returns will, of course, render it easier to afford.

If we ask ourselves how the health of the Canadian people can be improved, we shall find that the solution of many of the major health problems must await

¹ Royal Commission on Health Services, Vol. II, Ottawa: Queen's Printer, 1965, pp. 250-254.

further advances in medical science. This applies largely to the chronic and degenerative diseases though even here some improvement would be possible if all our present knowledge were more widely applied. Some problems can be reduced or completely eliminated by universal application of known preventive measures; examples are the venereal diseases and accidents, as well as the diseases for which effective immunization is available. Last but not least, the volume of morbidity and mortality in Canada could be reduced if the same high levels of health services and healthful environment could be brought to all groups of the population and class distinction in health is removed.

In this chapter the factors relating the health status to social conditions are summarized. They point out, in brief, that the success of public health programmes depends entirely on whether they are part of a process of social evolution or are sealed in the vacuum of a stagnant economy.¹

We must conclude that any war on poverty would be incomplete and not wholly effective if it were not at the same time also a war on ill health. And moreover, no war on ill health will be entirely effective if it is not also a war on poverty and other adverse social conditions. These two wars must be waged together.

It could not be hoped in this study to investigate fully the complex relationship between health and social conditions. But neither was it intended merely to replace the slogan "health is wealth" by another generality such as "disease is distress" or a similar one. It has been attempted rather to point at some concrete instances of such interrelationship in the hope that further study will reveal more specifically to what extent a more purposeful and socially oriented application of health services can reduce poverty and hence the need for welfare measures; on the other hand, to what extent welfare measures (such as income maintenance programmes and certain welfare services) and preferably also adaptation of certain economic policies (e.g., employment and retirement practices), can lead to a reduction of illness and its consequences, thus supporting the contributions by medical science to the improvement of the health of the Canadian people.

¹ Gunnar Myrdal as quoted by Horwitz, A., *op. cit.*

APPENDICES

APPENDIX A

HEALTH CHART

The following chart summarizes selected statistics presented and discussed in the text of the study. They are applicable to a population of 100,000 with the average characteristics of the population of Canada.

The chart is intended to serve several purposes:

1. as a ready statistical reference to the subject matter of the study;
2. as a bench mark for time series under the various headings as more current data become available (this may form part of a health yearbook containing current as well as historical data), and for the correction of existing data where they are inadequate. This may apply particularly to some of the incidence and prevalence figures derived from the Canadian Sickness Survey 1950–51;
3. as a possible model for similar charts with data applicable to particular health jurisdictions or practices. It may thus serve as a nucleus of the Health Ledger¹ which medical officers of health at all levels should have for ready reference and which could provide the private practitioner with valuable background material for his own practice;
4. as a basis for comparison of local or regional data with the corresponding provincial, national, or international data.

It would have been tempting to supplement the chart by maps showing geographic distributions and differences but this would have gone far beyond the scope of this volume. Wider use than is now made of such maps would be helpful for epidemiological as well as health planning purposes.

¹ Frappier, A., "The Prevention of Illness", Canadian Journal of Public Health, January 1963, p. 7.

REFERENCE CHART

THE PEOPLE AND THEIR HEALTH, IN A POPULATION OF 100,000,
CANADA, MOST RECENT YEAR

| Item | Ratio or Rate | Page of Study |
|---|------------------|------------------|
| Demographic Characteristics | | |
| Age distribution | | |
| 0-14 | 33,900 | 30 |
| 15-64 | 58,500 | " |
| 65 and over | 7,600 | " |
| Number of marriages annually | 690 | 34 |
| Number of live births annually | 2,530 | " |
| Number of people born in: | | |
| Canada | 84,400 | |
| Commonwealth countries | 5,600 | 38 |
| Other countries | 10,000 | " |
| Addictions | | |
| Number of alcoholics | 2,125 | 58 |
| Convictions related to alcohol (other than driving) | 662 | 63 |
| Convictions for driving while impaired or intoxicated | 139 | " |
| Number of narcotic addicts | 17 | 71 |
| Health | | |
| Number without apparent illness on average day | 85,700 | 13 |
| Number without apparent illness during year | 19,600 | 14 |
| General Morbidity and Mortality | | |
| On average day: | | |
| Number sick or with some symptom | 14,000 | 111 |
| Number disabled | 3,500 | " |
| Number seeing a physician | 1,500 | " |
| Number in hospital | 900 | " |
| Number admitted to hospital | 40 | " |
| Number dying | 2 | " |
| Number born | 6 | " |
| During year: | | |
| Number sick or with some symptom | 80,000 | 114 |
| Number disabled | 59,000 | " |
| Number seeing a physician | 73,000 | " |
| Number admitted to hospital | 16,000 | " |
| Number dying | 780 | " |
| Number born | 2,530 | " |
| Mortality: | | |
| Crude rate | 780 | 126 |
| Standardized rate (1956 population) | 760 | " |
| Age-proportional rate | 1,160 | " |
| Infant mortality rate, per 1,000 live births | 26.3 | 132 |
| Stillbirth rate, per 1,000 live births | 12.3 | 133 |
| Perinatal death rate, per 1,000 live births | 28.0 | " |
| Mortality from all infective diseases | 10.8 | 147 |
| Maternal mortality per 100,000 live births | 54.9 | " |

REFERENCE CHART (Cont'd)

| Item | Ratio or Rate | Page of Study |
|--|------------------|------------------|
| <u>Diagnostic Classes</u> | | |
| (annual rates unless otherwise specified) | | |
| Infective and Parasitic Diseases..... | | |
| Deaths | 7.5 | 157 |
| Hospital separations..... | 340.0 | " |
| Persons developing new illness during year | 9,910 | 178 |
| Scarlet fever, strept sore throat, erysipelas, septicaemia, pyaemia | 730 | " |
| Whooping cough..... | 680 | " |
| Other bacterial diseases | 540 | " |
| Measles | 3,420 | " |
| German measles | 550 | " |
| Chickenpox | 1,940 | " |
| Mumps..... | 2,060 | " |
| Infestations with worms..... | 520 | " |
| Fungus and arthropod diseases | 390 | " |
| Persons sick on average day | 740 | " |
| Scarlet fever, strept sore throat, erysipelas, septicaemia, pyaemia | 30 | " |
| Whooping cough..... | 80 | " |
| Other bacterial diseases | 170 | " |
| Measles | 110 | " |
| German measles | 10 | " |
| Chickenpox | 70 | " |
| Mumps..... | 70 | " |
| Infestations with worms..... | 100 | " |
| Fungus and arthropod diseases | 60 | " |
| Tuberculosis deaths..... | 3.9 | 164 |
| First admissions..... | 26.6 | 165 |
| Venereal diseases: | | |
| Cases of primary syphilis..... | 1.9 | 172 |
| Cases of gonorrhoea..... | 95.2 | " |
| Deaths from syphilis and sequelae | 0.8 | " |
| Infectious hepatitis, new cases | 67.5 | 175 |
| Neoplasms | | |
| Deaths | 134.6 | 181 |
| Hospital separations | 1,000 | " |
| Persons developing new illness during year | 520 | 191 |
| Persons sick on average day | 270 | " |
| Malignant neoplasms: | | |
| Deaths | 132.7 | 183 |
| Hospital separations | 520 | " |
| Allergic, Endocrine System, Metabolic and Nutritional Diseases | | |
| Deaths | 17.6 | 193 |
| Hospital separations | 660 | " |
| Persons developing new illness during year | 1,030 | 198 |
| Urticaria and other allergic disorders..... | 520 | " |
| Persons sick on average day | 680 | " |
| Hay fever | 80 | " |

REFERENCE CHART – (Cont'd)

| Item | Ratio or Rate | Page of Study |
|--|------------------|------------------|
| Asthma | 150 | 198 |
| Urticaria and other allergic disorders | 40 | " |
| Diabetes deaths | 12.2 | 194 |
| Asthma deaths | 2.6 | 196 |
| Diseases of the Blood and Blood-forming Organs | | |
| Deaths | 2.8 | 200 |
| Hospital separations | 110 | " |
| Persons developing new illness during year | 510 | 202 |
| Persons sick on average day | 390 | " |
| Anaemia deaths | 1.9 | " |
| Mental, Psychoneurotic and Personality Disorders | | |
| Deaths | 2.5 | 204 |
| First admissions | 180 | " |
| Diseases of the Nervous System and Sense Organs | | |
| Deaths | 90.7 | 210 |
| Hospital separations | 1,000 | " |
| Deaths from vascular lesions | 89.7 | 213 |
| Hospital separations for vascular lesions | 174 | 212 |
| Hospital separations for diseases of eye | 198 | " |
| Hospital separations for diseases of ear | 151 | " |
| Persons developing new illness during year | 6,370 | " |
| Neuralgia and neuritis | 820 | " |
| Conjunctivitis and ophthalmia | 370 | " |
| Hordoleum and other inflammatory eye diseases | 1,730 | " |
| Other diseases of eye | 470 | " |
| Otitis and mastoiditis | 460 | " |
| Other diseases of ear | 2,490 | " |
| Persons sick on average day | 950 | " |
| Migraine | 20 | " |
| Vascular lesions, epilepsy, and other diseases of brain and spinal cord | 230 | " |
| Neuralgia and neuritis | 160 | " |
| Conjunctivitis and ophthalmia | 10 | " |
| Hordoleum and other inflammatory eye diseases | 130 | " |
| Other diseases of eye | 220 | " |
| Otitis and mastoiditis | 30 | " |
| Other diseases of ear | 140 | " |
| Diseases of the Circulatory System | | |
| Deaths | 302.1 | 214 |
| Hospital separations | 1,780 | " |
| Persons developing new illness during year | 1,890 | 219 |
| Diseases of heart without hypertension, rheumatic fever | 670 | " |
| Hypertensive disease | 400 | " |
| Haemorrhoids, phlebitis, and other diseases of veins | 360 | " |
| Arterial and other diseases of circulatory system | 420 | " |
| Persons sick on average day | 1,690 | " |
| Diseases of heart without hypertension, rheumatic fever | 640 | " |
| Hypertensive disease | 460 | " |
| Varicose veins of lower extremities | 250 | " |

REFERENCE CHART – (Cont'd)

| Item | Ratio or Rate | Page of Study |
|---|------------------|------------------|
| Haemorrhoids, phlebitis, and other diseases of veins..... | 130 | 219 |
| Arterial and other diseases of circulatory system..... | 210 | " |
| Diseases of the Respiratory System | | |
| Deaths..... | 52.0 | 221 |
| Hospital separations..... | 4,540 | " |
| Persons developing new illness during year..... | 65,350 | 224 |
| Common cold | 39,840 | " |
| Acute pharyngitis | 5,970 | " |
| Acute tonsillitis, peritonsillar abscess (quinsy)..... | 900 | " |
| Acute laryngitis and tracheitis | 660 | " |
| Acute upper respiratory infection of multiple or unspecified sites..... | 2,150 | " |
| Influenza..... | 34,800 | " |
| Influenza with digestive manifestations | 4,210 | " |
| Pneumonia | 950 | " |
| Bronchitis | 2,950 | " |
| Hypertrophy of tonsils and adenoids | 960 | " |
| Chronic sinusitis..... | 580 | " |
| Pleurisy and other diseases of lungs, upper respiratory tract and pleural cavity | 1,140 | " |
| Persons sick on average day | 4,050 | " |
| Common cold | 1,780 | " |
| Acute pharyngitis | 130 | " |
| Acute tonsillitis, peritonsillar abscess (quinsy)..... | 50 | " |
| Acute laryngitis and tracheitis | 30 | " |
| Acute upper respiratory infection of multiple or unspecified sites..... | 70 | " |
| Influenza | 1,040 | " |
| Influenza with digestive manifestations | 70 | " |
| Pneumonia | 80 | " |
| Bronchitis | 350 | " |
| Hypertrophy of tonsils and adenoids | 80 | " |
| Chronic sinusitis..... | 160 | " |
| Pleurisy and other diseases of lungs, upper respiratory tract and pleural cavity | 210 | " |
| Diseases of the Digestive System | | |
| Deaths..... | 29.0 | 226 |
| Hospital separations..... | 2,920 | " |
| Persons developing new illness during year..... | 14,090 | 229 |
| Toothache and dental caries | 2,280 | " |
| Abscesses and other diseases of teeth and supporting structure | 470 | " |
| Disorders of occlusion, eruption and tooth development..... | 1,040 | " |
| Stomatitis and other diseases of buccal cavity and oesophagus..... | 490 | 230 |
| Ulcer of stomach and duodenum | 540 | " |
| Disorders of function of stomach and other diseases of stomach and duodenum | 7,030 | " |
| Diseases of appendix, hernia, intestinal obstruction | 1,030 | " |
| Gastro-enteritis and colitis, except ulcerative, age 4 weeks and over | 730 | " |

REFERENCE CHART – (Cont'd)

| Item | Ratio or Rate | Page of Study |
|--|------------------|------------------|
| Functional disorders and other diseases of intestines and peritoneum | 720 | 230 |
| Diseases of liver, gallbladder and pancreas..... | 1,320 | " |
| Persons sick on average day | 13,070 | 229 |
| Toothache and dental caries | 2,270 | " |
| Abscesses and other diseases of teeth and supporting structure | 470 | " |
| Disorders of occlusion, eruption, and tooth development.... | 1,070 | " |
| Stomatitis and other diseases of buccal cavity and oesophagus | 490 | 230 |
| Disorders of function of stomach and other diseases of stomach and duodenum | 6,770 | " |
| Diseases of appendix, hernia, intestinal obstruction | 880 | " |
| Gastro-enteritis and colitis, except ulcerative, age 4 weeks and over | 720 | " |
| Functional disorders and other diseases of intestines and peritoneum | 620 | " |
| Diseases of liver, gallbladder, and pancreas | 1,000 | " |
| Diseases of the Genito-Urinary System | | |
| Deaths..... | 16.0 | 232 |
| Hospital separations..... | 1,730 | " |
| Persons developing new illness during year..... | 2,650 | " |
| Diseases of kidney and ureter..... | 930 | " |
| Other diseases of urinary system..... | 590 | " |
| Diseases of genital organs | 1,240 | " |
| Persons sick on average day..... | 750 | " |
| Diseases of kidney and ureter | 150 | " |
| Other diseases of urinary system | 160 | " |
| Diseases of genital organs | 450 | " |
| Maternity and Complications | | |
| Deaths per 100,000 live births | 35.4 | 235 |
| Hospital separations..... | 3,410 | " |
| Persons developing new illness during year | 2,710 | 237 |
| Deliveries without complications | 2,320 | " |
| Complications of pregnancy, child birth and puerperium | 720 | " |
| Persons sick on average day..... | 160 | " |
| Deliveries without complications | 90 | " |
| Complications of pregnancy, child birth and puerperium..... | 70 | " |
| Diseases of the Skin and Cellular Tissue | | |
| Deaths..... | 0.9 | 239 |
| Hospital separations..... | 420 | " |
| Persons developing new illness during year..... | 4,000 | 241 |
| Boil and carbuncle | 1,200 | " |
| Cellulitis and impetigo | 670 | " |
| Other local skin infections..... | 1,000 | " |
| Eczema | 380 | " |
| Other diseases of skin | 900 | " |
| Persons sick on average day | 770 | " |
| Boil and carbuncle | 80 | " |
| Cellulitis and impetigo | 50 | " |

REFERENCE CHART – (Cont'd)

| Item | Ratio or Rate | Page of Study |
|--|------------------|------------------|
| Other local skin infections..... | 100 | 241 |
| Eczema | 280 | " |
| Other diseases of skin | 270 | " |
| Diseases of the Bones and Organs of Movement | | |
| Deaths..... | 2.3 | 242 |
| Hospital separations..... | 710 | " |
| Persons developing new illness during year..... | 2,330 | 244 |
| Muscular rheumatism..... | 1,070 | " |
| Rheumatism unspecified..... | 720 | " |
| Other diseases of bones, joints and musculoskeletal system | 420 | " |
| Persons sick on average day..... | 1,490 | " |
| Arthritis | 520 | " |
| Muscular rheumatism..... | 110 | " |
| Rheumatism unspecified..... | 570 | " |
| Other diseases of bones, joints and musculoskeletal system | 290 | " |
| Congenital Malformations | | |
| Deaths..... | 14.3 | 246 |
| Hospital separations..... | 140 | " |
| Certain Diseases of Early Infancy | | |
| Deaths..... | 37.3 | 249 |
| Hospital separations..... | 90 | " |
| Symptoms, Senility and Ill-defined Conditions | | |
| Deaths..... | 6.5 | 258 |
| Hospital separations..... | 610 | " |
| Persons developing new illness during year..... | 17,180 | 255 |
| Symptoms referable to nervous system and special senses.... | 770 | " |
| Symptoms referable to cardiovascular and lymphatic system .. | 740 | " |
| Symptoms referable to respiratory system | 2,640 | " |
| Symptoms referable to upper gastro-intestinal tract..... | 1,180 | " |
| Symptoms referable to abdomen and lower gastro- intestinal system | 2,770 | " |
| Symptoms referable to limbs and back | 4,240 | " |
| Nervousness and debility..... | 1,730 | " |
| Headache..... | 4,260 | " |
| Other ill-defined symptoms and conditions | 2,790 | " |
| Persons sick on average day..... | 2,470 | " |
| Symptoms referable to nervous system and special senses.... | 110 | " |
| Symptoms referable to cardiovascular and lymphatic system .. | 60 | " |
| Symptoms referable to respiratory system | 220 | " |
| Symptoms referable to upper gastro-intestinal tract..... | 50 | " |
| Symptoms referable to abdomen and lower gastro-intestinal system | 120 | " |
| Symptoms referable to limbs and back | 700 | " |
| Nervousness and debility..... | 540 | " |
| Headache..... | 320 | " |
| Other ill-defined symptoms and conditions | 340 | " |

REFERENCE CHART – (Concluded)

| Item | Ratio or Rate | Page of Study |
|--|------------------|------------------|
| Accidents, Poisonings, and Violence | | |
| Deaths | 63.2 | 257 |
| Hospital separations | 1,820 | 257 |
| Deaths due to motor vehicle | 23.6 | 259 |
| Deaths due to falls..... | 8.3 | " |
| Deaths due to transport (other than motor and rail)..... | 2.9 | " |
| Deaths due to poisoning | 2.0 | " |
| Deaths due to railway accident | 0.5 | " |
| Persons developing new illness during year | 10,700 | 264 |
| Persons sick on average day..... | 770 | " |
| Physical Impairments | | |
| Permanent physical disabilities..... | 7,100 | 268 |
| Minor and moderate | 4,000 | " |
| Severe and total..... | 3,100 | " |

APPENDIX B

LEGISLATION RELATED TO HEALTH

“The condition of perfect *public health* requires such laws and regulations, as will secure to man associated in society, the same sanitary enjoyments that he would have as an isolated individual; and as will protect him from injury from any influences connected with his locality, his dwelling-house, his occupation, or those of his associates or neighbors, of from any social causes.”

Shattuck, et al., - Report of the Sanitary Commission of
Massachusetts.

The extent to which health matters are subject to regulation by law is perhaps only dimly recognized by most Canadians and many of us are probably completely unaware of the degree to which legal provisions support the health services in maintaining or restoring health and in minimizing the consequences of ill health.

Yet, it is not surprising that society has translated its concern with various health problems of its members into legislative form. While the evidence presented to the Royal Commission on Health Services still contains conflicting views as to the respective responsibilities of the individual and the community in regard to the paying for personal health services, the community has long assumed responsibility, through its governments at the various levels, for the protection of health. Originally, legal provisions were applied to protect the community rather than the individual, as in the various areas of public health legislation aimed primarily at the prevention and control of communicable diseases. The matters regulated by law were largely those of general sanitation but governments soon began to assume responsibility also for providing certain services to individuals. These were preventive services such as immunization procedures or maternity and well-baby care. Gradually, the provision of public personal services was extended into the areas of diagnosis and treatment: tuberculosis, mental illness, cancer, are examples, as is the public provision of all health care needed for certain groups of the population such as the aged or the assistance recipients. The scope of legislation has broadened accordingly. It has also extended to keep pace with the changing needs of an industrial society, as in the case of workmen's compensation provisions, and with scientific development.

In the course of this study attention has been drawn repeatedly to legislation in regard to certain health matters, and it is probably only in a broad study of the many aspects of health and illness that one becomes aware of the extent of such legislation.

Reference was made to this fact in the discussion of alcoholic beverages and their use and abuse. We probably realize vaguely that the law forbids the issue of alcoholic beverages to minors and restricts the sale in public places, but few people will be aware of the regulations applying to the use of these beverages even

in private homes. Perhaps still less is known of the protection afforded in respect to many activities of our daily life by the laws governing the quality of food and drugs, and those controlling certain activities, procedures, and substances potentially dangerous to health.

It was thought, therefore, to be of interest generally, and particularly to health workers, to see an outline of existing legislation as attempted in Appendix "B". It is more than an attempt, however, for several reasons. One difficulty is to delineate the field of health for this purpose and here any selection must needs be arbitrary. Another difficulty, in a cursory review such as this, is to locate all laws that contain any reference to health; the list presented in the Appendix is only a byproduct of a study whose main objective lies in areas other than that of legislation. Nevertheless, the reasons for including the list, imperfect as it may be, are: 1) to give some idea of the extent of health-related legislation, 2) to provide a reference list for general purposes, and 3) to encourage those concerned with particular areas—geographically or in terms of subject matter—to complete the list to serve their own purposes and needs. Needless to say that a reference such as this remains useful only if kept up to date. If the catalogues presented here serve any of these objectives, it will have fulfilled its purpose.

It was not feasible to review each law individually for any reference to health matters; only the most recent index of laws was scanned for legislation possibly related to health. This, of course, makes the review rather superficial and, as pointed out, necessarily arbitrary; for instance, laws like the highway codes are excluded from the list though they contain provisions regarding road safety, while the inclusion of some laws may appear unwarranted to some.

The list comprises only legislation passed by the Parliament of Canada, the provincial legislatures, and the Councils of the Yukon and the Northwest Territories. A list of municipal legislation had to be left to be compiled as local needs require (though a collection of municipal laws in Canada may be very useful for comparative purposes).

A more detailed account of the contents is presented for the federal laws listed, and for the provinces of Ontario and Quebec because these are fairly representative of provincial legislation in general. References are given both to the original law and subsequent amendments. In some cases the title of the law seemed self-explanatory and adequate; otherwise, a brief explanatory note has been added. For more important and extensive pieces of legislation, essential sections are indicated with reference to the respective articles and amendments. For Prince Edward Island the references are only up to the revised statutes of 1951, since no cumulative index exists for the subsequent years. Laws of private nature or relating to individual institutions are not included in the reference list.

The omission, for reasons of expediency, of municipal legislation should not be allowed to detract from or obscure the importance of health legislation at this level of government. It is, in fact, at this level that legislation deals with some matters of the most immediate concern in our daily life. A review of the health legislation of the City of Ottawa, which may be fairly representative of legislation

elsewhere, revealed the following as among the areas of legislation: cleanliness and sanitation of eating places and lodging houses; the sale of food in public places; housing standards and decent living conditions; litter and garbage disposal; mobile canteens; municipal clinics; sewage; septic tanks; atmospheric pollution; sanitary conditions of barber shops and beauty parlors; pest extermination; sale of horse meat; noise; smoke abatement; and numerous other areas which conceivably could also be included under health.

This probably incomplete list, omitting municipal legislation, includes 455 distinct pieces of legislation, a good indication of the concern of the public and the legislators with matters concerning the health of the people.

LAWS OF THE DOMINION OF CANADA

Animal Contagious Diseases Act – R.S.C. (1952), c. 9.

Blind Persons Act – R.S.C. (1952), c. 17; concerns allowances to the blind and agreements with provinces for such allowances; AMENDED: S.C. (1955), c. 26; S.C. (1957-58), c. 4; S.C. (1957), c. 14; S.C. (1962), c. 2; S.C. (1963), c. 26.

Canada Medical Act – R.S.C. (1952), c. 27; Medical Council of Canada.

Canada Temperance Act – R.S.C. (1952), c. 30; traffic in intoxicating liquors (118-126), offenses (128-152), importation, exportation and manufacture of intoxicating liquor (153-167), aid of provincial legislation (168-180).

Civilian War Pensions and Allowances Act – R.S.C. (1952), c. 51; pensions for disability and death for merchant seamen, salt water fishermen, members of the R.C.M.P., and air raid workers; AMENDED: S.C. (1962), c. 11.

Department of National Health and Welfare Act – R.S.C. (1952), c. 74; AMENDED: S.C. (1962), c. 16.

Destructive Insect and Pest Act – R.S.C. (1952), c. 81; control of such insects and pests.

Disabled Persons Act – S.C. (1953-54), c. 55; financial aid in co-operation with provinces; AMENDED: S.C. (1957-58), c. 5; S.C. (1962), c. 3; S.C. (1963), c. 26.

Export Act – R.S.C. (1952), c. 103; in as much as regards export of intoxicating liquors.

Fitness and Amateur Sport Act – S.C. (1960-61), c. 59.

Food and Drugs Act – R.S.C. (1952), c. 123; control of food, drugs and cosmetics for the better health of Canadians; AMENDED: S.C. (1952-53), c. 38; S.C. (1960-61), c. 37; S.C. (1962-63), c. 15.

Government Employees Compensation Act – R.S.C. (1952), c. 134; AMENDED: S.C. (1955), c. 33.

Hospital Insurance and Diagnostic Services Act – S.C. (1957), c. 28; agreements (5) and (7), contributions (4) and (6); AMENDED: S.C. (1958), c. 6.

Immigration Act – R.S.C. (1952), c. 325; certain diseased or defective people prohibited (5), persons entering Canada for treatment not considered immigrants (7), medical examination (21), medical treatment possible on entry (48).

Importation of Intoxicating Liquors Act – R.S.C. (1952), c. 147.

Indian Act – R.S.C. (1952), c. 149; in as much as has to do with mentally incompetent Indians (51) and sale or possession of intoxicants (93-98).

Leprosy Act – R.S.C. (1952), c. 165.

Meat and Canned Foods Act – R.S.C. (1952), c. 177; inspection and control.

Merchant Seamen Compensation Act – R.S.C. (1952), c. 178.

Narcotic Drugs Act – S.C. (1960-61), c. 35.

Northwest Territories Act – R.S.C. (1952), c. 195; in as much as regards lunatics (78-81) and intoxicants (97-112).

Opium and Narcotic Drug Act – R.S.C. (1952), c. 201.

Pension Act – R.S.C. (1952), c. 207; in as much as regards pensions awarded to sick or disabled persons; AMENDED: S.C. (1953-54), c. 62; S.C. (1957-58), c. 19.

Pest Control Products Act – R.S.C. (1952), c. 209.

Proprietary or Patent Medicine Act – R.S.C. (1952), c. 220.

Public Works Health Act – R.S.C. (1952), c. 229; concerns health of people working on public buildings or projects.

Quarantine Act – R.S.C. (1952), c. 231.

Royal Canadian Mounted Police Act – R.S.C. (1952), c. 241; in as much as regards compensation for injury (22), gratuity for infirmity when pension not earned (50), and pension after ten years if infirm (66) and (71-75) and (97).

Statistics Act – R.S.C. (1952), c. 257; in as much as considers the compilation of health statistics.

Veterans Rehabilitation Act – R.S.C. (1952), c. 281.

Vocational Rehabilitation of Disabled Persons Act – S.C. (1961), c. 26.

Yukon Act – S.C. (1952-53), c. 53; in as much as considers insane persons (48-49), and intoxicants (16) and (47); AMENDED: S.C. (1958), c. 9.

LAWS OF THE PROVINCE OF ONTARIO

- Air Pollution Control Act* – R.S.O. (1960), c. 12; AMENDED: S.O. (1961-62), c. 3; S.O. (1962-63), c. 2.
- Alcoholism Research Foundation Act* – S.O. (1949), c. 4; AMENDED: S.O. (1951), c. 3; S.O. (1955), c. 3; S.O. (1959), c. 4; S.O. (1960-61), c. 2; S.O. (1961-62), c. 4; S.O. (1962-63), c. 3; S.O. (1964) c. 1.
- Blind Persons' Allowances Act* – R.S.O. (1960), c. 35.
- Blind Workmen's Compensation Act* – R.S.O. (1960), c. 36.
- Brucellosis Act* – R.S.O. (1960), c. 41; AMENDED: S.O. (1962-63), c. 9.
- Cancer Act* – R.S.O. (1960), c. 45; AMENDED: S.O. (1961-62), c. 11.
- Cancer Remedies Act* – R.S.O. (1960), c. 46; commission for investigation of cancer remedies.
- Children's Mental Hospital Act* – R.S.O. (1960), c. 56; AMENDED: S.O. (1960-61), c. 8; S.O. (1962-63), c. 15.
- Chiropody Act* – R.S.O. (1960), c. 57.
- Community Psychiatric Hospitals Act* – S.O. (1960-61), c. 9.
- Dental Technicians Act* – R.S.O. (1960), c. 90; professional organization of dental technicians; AMENDED: S.O. (1960-61), c. 17.
- Dentistry Act* – R.S.O. (1960), c. 91; professional organization of dentists; AMENDED: S.O. (1961-62), c. 29.
- Disabled Persons' Allowances Act* – R.S.O. (1960), c. 107.
- Drugless Practitioners Act* – R.S.O. (1960), c. 114; professional organization; AMENDED: S.O. (1961-62), c. 36.
- Fluoridation Act* – S.O. (1960-61), c. 30.
- Homes for Retarded Children's Act* – S.O. (1962-63), c. 57.
- Hospitals Services Commission Act* – R.S.O. (1960), c. 176; hospital care insurance plan; AMENDED: S.O. (1961-62), c. 55; S.O. (1962-63), c. 58.
- Hospital and Charitable Institutions Inquiries Act* – R.S.O. (1960), c. 177.
- Hospital Tax Act* – R.S.O. (1960), c. 178; taxes creating revenue for maintaining hospitals; AMENDED: S.O. (1961-62), c. 56; S.O. (1964), c. 40.
- Human Tissue Act* – S.O. (1962-63), c. 59; transplant of human tissue.
- Hypnosis Act* – S.O. (1960-61), c. 38; control of hypnosis.
- Liquor Control Act* – R.S.O. (1960), c. 217; administration (2–29), government stores (30–55), special permits (56–62), prohibitions, interdiction, penalties and procedure in prosecution and on appeal (70–145); AMENDED: S.O. (1960-61), c. 47; S.O. (1961-62), c. 72.

Liquor Licence Act – R.S.O. (1960), c. 218; AMENDED: S.O. (1961-62), c. 73.

Maternity Boarding Houses Act – R.S.O. (1960), c. 231.

Meat Inspection Act – S.O. (1962-63), c. 78.

Medical Act – R.S.O. (1960), c. 234; College of Physicians and Surgeons;
AMENDED: S.O. (1962-63), c. 80.

Mental Health Act – R.S.O. (1960), c. 235; information relating to mental health (2), director (3), mental health officers (4-7), discharge of patients (8), administration (9-13).

Mental Hospitals Act – R.S.O. (1960), c. 236; administration (2-11), patients in institutions (12-18), mentally ill and mentally defective persons (19-40), discharge, escapes and apprehension (44-48), epileptics (55), examination, detention and observation units (56-71), mental health clinics (104-113);
AMENDED: S.O. (1960-61), c. 55; S.O. (1961-62), c. 79; S.O. (1962-63), c. 81.

Mental Incompetency Act – R.S.O. (1960), c. 237; AMENDED: S.O. (1964), c. 60.

Municipal Health Services Act – R.S.O. (1960), c. 256; definition of municipal role in the field of health.

Nurses Act – S.O. (1961-62), c. 90; professional organization; AMENDED: S.O. (1962-63), c. 92; S.O. (1964), c. 73.

Ontario Mental Health Foundation Act – S.O. (1960-61), c. 67; AMENDED: S.O. (1964), c. 80.

Ophthalmic Dispensers Act – S.O. (1960-61), c. 72; professional organization;
AMENDED: S.O. (1961-62), c. 100; S.O. (1962-63), c. 100.

Optometry Act – R.S.O. (1960), c. 283; professional organization; AMENDED: S.O. (1960-61), c. 73; S.O. (1961-62), c. 101.

Pesticides Act – R.S.O. (1960), c. 293; AMENDED: S.O. (1962-63), c. 104.

Pharmacy Act – R.S.O. (1960), c. 295; AMENDED: S.O. (1961-62), c. 103; S.O. (1964), c. 89.

Prepaid Hospital and Medical Services Act – R.S.O. (1960), c. 304; no association to carry out business on a prepayment basis unless registered under this Act (4), registration (5-11) and (17-18), administration (12-13).

Private Hospitals Act – R.S.O. (1960), c. 305; powers and administration of private hospitals; AMENDED: S.O. (1962-63), c. 107.

Private Sanitaria Act – R.S.O. (1960), c. 307; AMENDED: S.O. (1961-62), c. 110; S.O. (1962-63), c. 108.

Psychiatric Hospitals Act – R.S.O. (1960), c. 315; establishment, administration and maintenance of hospitals; AMENDED: S.O. (1962-63), c. 111.

Psychologists Registration Act – R.S.O. (1960), c. 316; AMENDED: S.O. (1962-63), c. 112.

- Public Health Act* – R.S.O. (1960), c. 321; administration (2-12) and (52-53), clinical laboratory centres (11), local boards of health (13-33), medical officers of health (34-43), hospitals (44-51), communicable diseases (56-78), fluoridation (79-80), pre-school examinations (81), nuisances and offensive trades (82-95), inspection in schools, lodging houses, laundries, etc. (96-99), inspection of upholstered or stuffed articles, of dairies, of animals, of meat, of milk, of waterworks, sewerage, of ice supplies, of slaughter houses and abattoirs (100-113), procedure (114-123), unorganized territory (124-131); AMENDED: S.O. (1960-61), c. 80; S.O. (1961-62), c. 115; S.O. (1962-63), c. 113; S.O. (1964), c. 93.
- Public Hospitals Act* – R.S.O. (1960), c. 322; nature, administration and role of hospitals; AMENDED: S.O. (1961-62), c. 116; S.O. (1964), c. 94.
- Radiological Technicians Act* – S.O. (1962-63), c. 122; professional organization; AMENDED: S.O. (1964), c. 98.
- Rehabilitation Services Act* – S.O. (1955), c. 71.
- Sanatoria for Consumptives Act* – R.S.O. (1960), c. 359; AMENDED: S.O. (1961-62), c. 129.
- Silicosis Act* – R.S.O. (1960), c. 375.
- Venereal Diseases Prevention Act* – R.S.O. (1960), c. 415.
- Vital Statistics Act* – R.S.O. (1960), c. 419; AMENDED: S.O. (1960-61), c. 102; S.O. (1961-62), c. 142; S.O. (1962-63), c. 141; S.O. (1964), c. 123.
- White Cane Act* – R.S.O. (1960), c. 430; use of white cane restricted to blind.
- Workmen's Compensation Act* – R.S.O. (1960), c. 437; AMENDED: S.O. (1962-63), c. 145; S.O. (1964), c. 124.

LAWS OF THE PROVINCE OF QUEBEC

- Agricultural Abuses Act* – R.S.Q. (1941), c. 139; among other things, considers the question of vicious dogs and animals with contagious diseases.
- Animal Health Protection Act* – R.S.Q. (1941), c. 135.
- Assistance to Disabled Persons, an Act Respecting* – S.Q. (1954-55), c. 9; granting, administration and conditions of allowances to disabled persons.
- Blind Persons Allowances Act* – S.Q. (1951-52), c. 4; administration, granting and nature of allowances to blind persons.
- Canned Foods Act* - R.S.Q. (1941), c. 140.
- Charitable Institutions Injured Persons, Cost Payments Act* – R.S.O. (1941), c. 339.

Child Protection Tuberculosis Act – R.S.Q. (1941), c. 191; child family placement service (2-4), admission of pupils (5), administration (6-9).

Cocaine and Morphine Sales Act – R.S.Q. (1941), c. 260.

Curatorship of Non-Interdicted Insane Persons, an Act Respecting – R.S.Q. (1941), c. 327.

Dairy Products Act – R.S.Q. (1941), c. 126; AMENDED: S.Q. (1947), c. 46; S. Q. (1950), c. 64; S.Q. (1956-57), c. 11; S.Q. (1959-60), c. 60; S.Q. (1960-61), c. 58; S.Q. (1963), c. 36; S.Q. (1964), c. 39.

Dental Act (Quebec) – R.S.Q. (1941), c. 268; organization of corporation of dental surgeons; AMENDED: S.Q. (1948), c. 33; S.Q. (1950), c. 69; S.Q. (1951-52), c. 54; S.Q. (1954-55), c. 43; S.Q. (1958-59), c. 43; S.Q. (1958-59), c. 45; S.Q. (1959-60), c. 83; S.Q. (1963), c. 48.

Dental Technicians, an Act Respecting – S.Q. (1944), c. 43; association of dental technicians.

Department of Health and Social Welfare Act – R.S.Q. (1941), c. 182.

Development of the Institute of Microbiology and Hygiene of Montreal University, an Act to Promote – S.Q. (1959-60), c. 91.

Dispensing Opticians Act – R.S.Q. (1941), c. 275; organization of professional association; AMENDED: S.Q. (1953-54), c. 62; S.Q. (1954-55), c. 44; S.Q. (1963), c. 50.

Establishment of Medical Diagnosis Centres in the Province, an Act to Ensure – S.Q. (1951-52), c. 8; AMENDED: S.Q. (1957-58), c. 15.

Establishment of New Hospitals in the Province, an Act to Facilitate – S.Q. (1958-59), c. 10.

Health Units Act – R.S.Q. (1941), c. 184.

Homeopaths' Act – R.S.Q. (1941), c. 266; professional organization.

Hospitals for the Treatment of Mental Diseases, an Act Respecting – S.Q. (1950), c. 31; institutions (1-5), medical board (6-7), admission and treatment (8-14), discharge and transfer (15-21), visits to patients (22-23), prisoners (24-27), homes (28-29), special provisions (30-33), payment of expenses (34), federal institutions (35).

Hospital Tax on Meals, an Act Respecting – R.S.Q. (1941), c. 89; AMENDED: S.Q. (1944), c. 21.

Hospitalization Problems, an Act Respecting – S.Q. (1953-54), c. 55; nature, duties, etc., of committee; AMENDED: S.Q. (1954-55), c. 21; S.Q. (1955-56), c. 22; S.Q. (1957-58), c. 10.

Liquor Board Act (Quebec) – S.Q. (1960-61), c. 86; board (3-9), permits (10-74), and (76-82), sale, possession and transportation (97-112), advertising

(121-122), cider (123), offences and penalties (124-142), procedure (83), and (143-190); AMENDED: S. Q. (1962), c. 51.

Mental Diseases, an Act Respecting – S.Q. (1951-52), c. 47; AMENDED: S.Q. (1953-54), c. 58.

Medical Act – (Quebec) – R.S.Q. (1941), c. 264; College of Physicians and Surgeons; AMENDED: S.Q. (1948), c. 32; S.Q. (1949), c. 64; S.O. (1950-51), c. 63; S.Q. (1954-55), c. 42; S.Q. (1962), c. 53.

Narcotics Act – (Quebec) – R.S.Q. (1941), c. 259.

Optometrists' and Opticians' Act – R.S.Q. (1941), c. 274; professional organization; AMENDED: S.Q. (1953-54), c. 61; S.Q. (1960-61), c. 90; S.Q. (1963), c. 49.

Organization of Institutions for Detained Persons Suffering from Mental Diseases, an Act to Authorize – S.Q. (1950), c. 32; AMENDED: S.Q. (1953-54), c. 57.

Pharmacy Act – (Quebec) – R.S.Q. (1941), c. 267; professional organization; AMENDED: S.Q. (1944), c. 42; S.Q. (1952-53), c. 55; S.Q. (1964), c. 55.

Pollution of Water, an Act to Remedy – S.Q. (1960-61), c. 16; AMENDED: S.Q. (1963), c. 17.

Pollution of Waters, an Act Respecting – S.Q. (1955-56), c. 11; AMENDED: S.Q. (1956-57), c. 65.

Private Hospitals Act – R.S.Q. (1941), c. 192; AMENDED: S.Q. (1949), c. 55.

Provincial Sports Council, an Act to Create – R.S.Q. (1941), c. 253.

Public Charities Act – (Quebec) – R.S.Q. (1941), c. 187; care of indigents.

Public Curatorship, an Act to Institute – S.Q. (1945), c. 62; AMENDED: S.Q. (1946), c. 52; S.Q. (1947), c. 70; S.Q. (1948), c. 42; S.Q. (1950), c. 24; S.Q. (1951-52), c. 55; S.Q. (1963), c. 59.

Public Health Act – (Quebec) – R.S.Q. (1941), c. 183; provincial bureau of health (3-98), health in industrial establishments (99-103), epidemics (104-118), inoculation and vaccination (119-134), vital statistics (135-148), prosecutions (149); AMENDED: S.Q. (1951-52), c. 46; S.Q. (1953-54), c. 53; S.Q. (1955-56), c. 36; S.Q. (1959-60), c. 72.

Right of Expropriation by Certain Hospitals, an Act Respecting – S.Q. (1951-52), c. 48; AMENDED: S.Q. (1953-54), c. 56; S.Q. (1955-56), c. 60.

Study of Anatomy Act – R.S.Q. (1941), c. 265.

Temperance Act – (Quebec) – R.S.Q. (1941), c. 257; the passing of municipal by-laws regarding alcoholic beverages; AMENDED: S.Q. (147), c. 61.

Tobacco Act – R.S.Q. (1941), c. 134.

Tuberculosis and Infantile Mortality Act – R.S.Q. (1941), c. 185.

Venereal Diseases Prevention Act – R.S.Q. (1941), c. 186; report to director (3-4), powers of director (5), prisoners (6), examination in hospitals (8), dispensaries (9), procedure and administration (7), and (12-16).

Workmen's Compensation Act – R.S.Q. (1941), c. 160; AMENDED: S.Q. (1943), c. 27; S.Q. (1944), c. 29; S.Q. (1945), c. 42; S.Q. (1945), c. 43; S.Q. (1946), c. 35; S.Q. (1947), c. 51; S.Q. (1949), c. 53; S.Q. (1951-52), c. 34; S.Q. (1951-52), c. 35; S.Q. (1954-55), c. 8; S.Q. (1954-55), c. 37; S.Q. (1955-56), c. 7; S.Q. (1955-56), c. 12; S.Q. (1956-57), c. 49; S.Q. (1956-57), c. 62; S.Q. (1959-60), c. 6; S.Q. (1963), c. 4; S.Q. (1964), c. 44.

LAWS OF THE PROVINCE OF ALBERTA

Blind Persons Act -

R.S.A. (1956), c.24;
AMENDED: S.A. (1964), c. 106.

Blind Persons' White Cane Act -

R.S.A. (1956), c.25.

Blind Workmen's Compensation Act -

R.S.A. (1956), c. 26.

Cancer Treatment and Prevention Act -

R.S.A. (1956), c. 35; AMENDED:
S.A. (1963), c. 5.

Chiropody Professions Act -

R.S.A. (1956), c. 40.

Chiropractic Act -

R.S.A. (1956), c. 41; AMENDED:
S.A. (1959), c. 65;
S.A. (1961), c. 12.

Corneal Transplants Act -

S.A. (1960), c. 19.

Dental Association Act -

R.S.A. (1956), c. 82; AMENDED:
S.A. (1959), c. 65; S.A. (1961),
c. 22; S.A. (1964), c. 20.

Dental Auxiliaries Act -

S.A. (1960), c. 23.

Dental Technicians Act -

S.A. (1961), c. 23.

Disabled Persons Act -

R.S.A. (1956), c. 86; AMENDED:
S.A. (1956), c. 14; S.A. (1957),
c. 17; S.A. (1958), c. 14;
S.A. (1961), c. 87; S.A. (1962),
c. 75.

Fatal Accidents Act -

R.S.A. (1956), c. 111; AMENDED:
S.A. (1960), c. 31.

Health Unit Act -

R.S.A. (1956), c. 139; AMENDED:
S.A. (1956), c. 21; S.A. (1957),
c. 27; S.A. (1958), c. 23;
S.A. (1959), c. 27; S.A. (1960),
c. 39; S.A. (1962), c. 31;
S.A. (1963), c. 23.

Hospital Lien Act -

R.S.A. (1956), c. 144.

Hospital Voting Act -

S.A. (1960), c. 42.

Hospitalization and Treatment Services Act -

R.S.A. (1956), c. 146.

Hospitals Act (Alberta) -

S.A. (1961), c. 36; AMENDED:
S.A. (1962), c. 32.

Liquor Control Act -

R.S.A. (1956), c. 179; AMENDED:
S.A. (1958), c. 37; S.A. (1959),
c. 45; S.A. (1960), c. 59;
S.A. (1962), c. 41; S.A. (1964), c. 46.

Liquor Licencing Act -

S.A. (1958), c. 38; AMENDED:
S.A. (1959), c. 45; S.A. (1960),
c. 59; S.A. (1962), c. 42;
S.A. (1964), c. 47.

Liquor Plebiscites Act -

S.A. (1958), c. 39.

Maternity Hospitalization Act -

R.S.A. (1956), c. 197; AMENDED:
S.A. (1960), c. 64; S.A. (1963), c. 34.

Medical Carriers Act -

S.A. (1964), c. 52.

*Medical Research and Education
Foundation Act -*

S.A. (1964), c. 53.

Medical Profession Act -

R.S.A. (1956), c. 199; AMENDED:
S.A. (1959), c. 50;
S.A. (1962), c. 48.

Mental Defectives Act -

R.S.A. (1956), c. 199; AMENDED:
S.A. (1959), c. 50;
S.A. (1962), c. 48.

Mental Diseases Act -

R.S.A. (1956), c. 200; AMENDED:
S.A. (1956), c. 29;
S.A. (1959), c. 5.

Mental Health Act -

S.A. (1964), c. 54.

Mentally Incapacitated Persons Act -

R.S.A. (1956), c. 201.

M.L.A. Compensation Act -

R.S.A. (1956), c. 206.

Municipal Hospitals Act -

R.S.A. (1956), c. 216.

*Municipal Hospital Votes Validation
Act - (1957) -*

S.A. (1958), c. 49.

Naturopathy Act -

R.S.A. (1956), c. 221; AMENDED:
S.A. (1959), c. 65.

Nursing Aides Act -

R.S.A. (1956), c. 224; AMENDED:
S.A. (1958), c. 53; S.A. (1964), c. 64.

Nursing Services Act -

R.S.A. (1956), c. 225; AMENDED:
S.A. (1962), c. 58.

Optometry Act -

R.S.A. (1956), c. 229; AMENDED:
S.A. (1959), c. 65.

Pharmaceutical Association Act -

R.S.A. (1956), c. 232; AMENDED:
S.A. (1957), c. 65; S.A. (1962), c. 61.

Physiotherapists Act (Chartered) -

R.S.A. (1956), c. 233.

Podiatry Act -

S.A. (1964), c. 69.

Poliomyelitis Sufferers Act -

R.S.A. (1956), c. 237.

Provincial General Hospitals Act -

S.A. (1959), c. 62; AMENDED:
S.A. (1962), c. 67.

Psychiatric Nurses Association Act -

S.A. (1963), c. 45.

Psychologists Association Act -

S.A. (1960), c. 79; AMENDED:
S.A. (1962), c. 68.

Public Health Act -

R.S.A. (1956), c. 255; AMENDED:
S.A. (1956), c. 42; S.A. (1957),
c. 69; S.A. (1958), c. 63; S.A.
(1959), c. 66; S.A. (1960), c. 12;
S.A. (1961), c. 61; S.A. (1962),
c. 69; S.A. (1964), c. 72.

Public Health Act - (The Department of) - University Hospital Foundation Act -
 R.S.A. (1956), c. 256; AMENDED: S.A. (1962), c. 96.
 S.A. (1956), c. 13; S.A. (1961),
 c. 46.

Public Health Nurses Act -
 R.S.A. (1956), c. 283.

Registered Nurses Act -
 R.S.A. (1956), c. 283; AMENDED:
 S.A. (1960), c. 89.

Sexual Sterilization Act -
 R.S.A. (1956), c. 311.

Tuberculosis Act -
 R.S.A. (1956), c. 347.

Venereal Diseases Prevention Act -
 R.S.A. (1956), c. 358.

Vital Statistics Act -
 S.A. (1959), c. 94; AMENDED:
 S.A. (1962), c. 98; S.A. (1963), c. 6.

Workmen's Compensation Act -
 R.S.A. (1956), c. 370; AMENDED:
 S.A. (1956), c. 62; S.A. (1960),
 c. 80; S.A. (1961), c. 89.

LAWS OF THE PROVINCE OF BRITISH COLUMBIA

Anatomy Act -
 R.S.B.C. (1960), c. 9.

Blind Persons' Allowances Act -
 R.S.B.C. (1960), c. 29; AMENDED:
 S.B.C. (1961), c. 59.

Blind Persons' White Cane Act -
 R.S.B.C. (1960) c. 30.

Blind Workmen's Compensation Act -
 R.S.B.C. (1960), c. 31.

Chiropractic Act -
 R.S.B.C. (1960), c. 54; AMENDED:
 S.B.C. (1964), c. 10.

Contribution for the Blind Act -
 S.B.C. (1964), c. 12.

Cornea Transplant Act -
 S.B.C. (1961), c. 12; AMENDED:
 S.B.C. (1963), c. 11.

Curators Act -
 R.S.B.C. (1960), c. 90.

Dental Technicians Act -
 R.S.B.C. (1960), c. 98; AMENDED:
 S.B.C. (1962), c. 20.

Dentistry Act -
 R.S.B.C. (1960), c. 99; AMENDED:
 S.B.C. (1962), c. 21.

*Department of Health Services and
Hospital Insurance Act -*
 R.S.B.C. (1960), c. 102.

Disabled Persons' Allowances Act -
 R.S.B.C. (1960), c. 113; AMENDED:
 S.B.C. (1961), c. 59.

Drunkards Act -
 R.S.B.C. (1960), c. 122.

Families' Compensation Act -
 R.S.B.C. (1960), c. 138; AMENDED:
 S.B.C. (1961), c. 17.

Government Liquor Act -
 R.S.B.C. (1960), c. 166; AMENDED:
 S.B.C. (1961), c. 59; S.B.C. (1963),
 c. 42.

Health Act -
 R.S.B.C. (1960), c. 170; AMENDED
 S.B.C. (1961), c. 25; S.B.C. (1962),
 c. 25.

- Health Insurance Act -*
R.S.B.C. (1960), c. 171.
- Hospital Act -*
R.S.B.C. (1960), c. 178; AMENDED:
S.B.C. (1961), c. 27; S.B.C. (1963),
c. 42; S.B.C. (1964), c. 29.
- Hospital Construction Aid Tax Act -*
R.S.B.C. (1960), c. 179; AMENDED:
S.B.C. (1962), c. 26; S.B.C. (1963),
c. 17.
- Hospital Insurance Act -*
R.S.B.C. (1960), c. 180; AMENDED:
S.B.C. (1961), c. 59.
- Liquor Control Plebiscites Act -*
R.S.B.C. (1960), c. 221.
- Lunacy Act -*
R.S.B.C. (1960), c. 226; AMENDED:
S.B.C. (1962), c. 44.
- Meat and Canned Foods Act -*
R.S.B.C. (1960), c. 236.
- Meat Inspection Act -*
R.S.B.C. (1960), c. 237; AMENDED:
S.B.C. (1961), c. 37; S.B.C. (1963),
c. 25.
- Medical Act -*
R.S.B.C. (1960), c. 239.
- Mental Health Act -*
S.B.C. (1964), c. 29.
- Naturopathic Physicians Act -*
R.S.B.C. (1960), c. 264.
- Optometry Act -*
R.S.B.C. (1960), c. 272.
- Patients Estates Act -*
S.B.C. (1962), c. 44; AMENDED:
S.B.C. (1964), c. 36.
- Pharmacy Act -*
R.S.B.C. (1960), c. 282; AMENDED:
S.B.C. (1964), c. 38.
- Physiotherapists and Massage
Practitioners Act -*
R.S.B.C. (1960), c. 283.
- Podiatry Act -*
R.S.B.C. (1960), c. 53; AMENDED:
S.B.C. (1963), c. 8.
- Pollution Control Act -*
R.S.B.C. (1960), c. 289; AMENDED:
S.B.C. (1963), c. 42.
- Practical Nurses Act -*
R.S.B.C. (1960), c. 295.
- Provincial Infirmaries Act -*
R.S.B.C. (1960), c. 309; AMENDED:
S.B.C. (1961), c. 47.
- Psychiatric Nurses Act -*
R.S.B.C. (1960), c. 313; AMENDED:
S.B.C. (1961), c. 49.
- Public Services Medical Plan Act -*
R.S.B.C. (1960), c. 322; AMENDED:
S.B.C. (1963), c. 37.
- Registered Nurses Act -*
R.S.B.C. (1960), c. 335.
- Sexual Sterilization Act -*
R.S.B.C. (1960), c. 353; AMENDED:
S.B.C. (1964), c. 29.
- Tuberculosis Institutions Act -*
R.S.B.C. (1960), c. 391.
- University of British Columbia, Health
Sciences Centre Act -*
S.B.C. (1963), c. 51.
- Venereal Diseases Suppression Act -*
R.S.B.C. (1960), c. 398.
- Vital Statistics Act -*
R.S.B.C. (1960), c. 402; AMENDED:
S.B.C. (1962), cc. 66, 67.
- Workmen's Compensation Act -*
R.S.B.C. (1960), c. 413; AMENDED:
S.B.C. (1963), c. 42.

LAWS OF THE PROVINCE OF MANITOBA

Alcoholism Foundation Act -

S.M. (1956), c. 1; AMENDED:
S.M. (1961), 1st sess., c. 21;
S.M. (1964), 1st sess., c. 1.

Anatomy Act -

R.S.M. (1954), c. 5; AMENDED:
S.M. (1959), 2nd sess., c. 5;
S.M. (1961), 1st sess., c. 2.

Blind Persons' Allowances Act -

R.S.M. (1954), c. 18; AMENDED:
S.M. (1955), c. 4; S.M. (1959), 2nd
sess., c. 6; S.M. (1961), 1st sess.,
c. 21; S.M. (1964), 1st sess., c. 4.

*Blind and Deaf Persons' Maintenance
and Education Act -*

R.S.M. (1954), c. 19.

Cancer Treatment and Research Act -

S.M. (1957), c. 6.

Chiropodists Act -

R.S.M. (1954), c. 36; AMENDED:
S.M. (1956), c. 69; S.M. (1957), c. 8.

Chiropractic Act -

R.S.M. (1954), c. 37.

Cornea Transplant Act -

S.M. (1961), 1st sess., c. 9.

Dental Association Act -

R.S.M. (1954), c. 62; AMENDED:
S.M. (1958), 1st sess., c. 10;
S.M. (1960), c. 9.

Disabled Persons Act -

S.M. (1955), cc. 13, 14; AMENDED:
S.M. (1959), 2nd sess., c. 16;
S.M. (1961), 1st sess., c. 21;
S.M. (1964), 1st sess., c. 14.

Elderly and Infirm Persons' Housing Act -

S.M. (1964), 1st sess., c. 17.

Fatal Accidents Act -

R.S.M. (1954), c. 84; AMENDED:
S.M. (1960), c. 78.

Fitness and Amateur Sport Act -

S.M. (1962), c. 22.

Health Act, Department of -

S.M. (1961), 1st sess., c. 20;
AMENDED: S.M. (1962), c. 25;
S.M. (1964), 1st sess., c. 46.

Health Services Act -

R.S.M. (1954), c. 111; AMENDED:
S.M. (1954), c. 13; S.M. (1955),
c. 28; S.M. (1956), c. 30; S.M. (1957),
cc. 26, 73; S.M. (1958), 1st sess.,
c. 67; S.M. (1959), 2nd sess., c. 58;
S.M. (1960), cc. 18, 78; S.M. (1961),
1st sess., cc. 21, 22, 53; S.M. (1962),
c. 26; S.M. (1963), c. 32; S.M.
(1964), 1st sess., c. 20.

Hospital Services Insurance Act -

S.M. (1962), c. 30; AMENDED:
S.M. (1964), 1st sess., c. 46.

Hospitals Act -

S.M. (1958), 1st sess., c. 23;
AMENDED: S.M. (1959), 2nd sess.,
c. 27; S.M. (1960), c. 21; S.M.
(1961), 1st sess., cc. 21, 25; S.M.
(1962), c. 28; S.M. (1963), c. 34;
S.M. (1964), c. 46.

*Hospital Debentures Guarantee, 1960,
Act -*

S.M. (1960), c. 22; AMENDED: S.M.
(1961), 1st sess., cc. 26, 53;
S.M. (1962), c. 29.

Liquor Control Act -

S.M. (1956), c. 40; AMENDED:
S.M. (1956), c. 40; S.M. (1957),
c. 38; S.M. (1958), 1st sess., c. 35;
S.M. (1959), 2nd sess., cc. 34, 58;
S.M. (1960), c. 34; S.M. (1961),
1st sess., c. 33; S.M. (1962), cc.
40, 66; S.M. (1963), c. 77; S.M.
(1964), 1st sess., c. 26.

Lunacy Act -

R.S.M. (1954), c. 149; AMENDED:
S.M. (1956), c. 41; S.M. (1958), 1st
sess., c. 36; S.M. (1961), 1st sess.,
c. 21.

*Manitoba Hospital Service Association
Act -*

S.M. (1954), c. 60; AMENDED:
S.M. (1958), 1st sess., c. 108;
S.M. (1959), 2nd sess., c. 36.

Medical Act -

S.M. (1964), 1st sess., c. 85.

Mental Deficiency Act -

R.S.M. (1954), c. 160; AMENDED:
S.M. (1957), c. 73; S.M. (1961), 1st
sess., c. 21.

Mental Diseases Act -

R.S.M. (1954), c. 161; AMENDED:
S.M. (1961), 1st sess., c. 21;
S.M. (1962), c. 46.

Narcotic Drug Addicts Act -

R.S.M. (1954), c. 178.

Naturopathic Act -

R.S.M. (1954), c. 184.

Ophthalmic Dispensers Act -

R.S.M. (1954), c. 191; AMENDED:
S.M. (1958), 1st sess., c. 67;
S.M. (1960), c. 48.

Optometry Act -

S.M. (1957), c. 48; AMENDED:
S.M. (1958), 1st sess., c. 76.

Osteopathic Act -

R.S.M. (1954), c. 194.

Pesticides Act -

S.M. (1963), c. 58.

Pharmaceutical Act -

R.S.M. (1954), c. 198; AMENDED:
S.M. (1955), c. 51; S.M. (1961), 1st
sess., cc. 46, 53; S.M. (1964), 1st
sess., c. 38.

Physiotherapists Amendment Act -

S.M. (1963), c. 59.

Pollution of Waters Prevention Act -

R.S.M. (1954), c. 201; AMENDED:
S.M. (1959), 2nd sess., c. 58;
S.M. (1960), cc. 50, 78.

Practical Nurses Act -

R.S.M. (1954), c. 204; AMENDED:
S.M. (1957), c. 50; S.M. (1959), 2nd
sess., c. 45; S.M. (1961), 1st sess.,
c. 21; S.M. (1964), 1st sess., c. 46.

Private Hospitals Act -

R.S.M. (1954), c. 206; AMENDED:
S.M. (1958), 1st sess., c. 49;
S.M. (1961), 1st sess., c. 21;
S.M. (1962), c. 57.

Psychiatric Nurses Association Act -

S.M. (1960), c. 108; AMENDED:
S.M. (1961), 1st sess., c. 53;
S.M. (1963), c. 64; S.M. (1964), 1st
sess., c. 41.

Psychiatric Nurses Training Act -

S.M. (1960), c. 54; AMENDED:
S.M. (1963), c. 65.

Public Health Act -

R.S.M. (1954), c. 211; AMENDED:
S.M. (1957), c. 54; S.M. (1959), 2nd
sess., c. 58; S.M. (1961), 1st sess.
cc. 21, 53, 54.

Registered Nurses Act -

R.S.M. (1954), c. 222; AMENDED:
S.M. (1961), 1st sess., c. 21;
S.M. (1963), c. 70; S.M. (1964), 1st
sess., c. 46.

Sanatorium Board, an Act Respecting -

S.M. (1962) c. 65.

Tobacco Tax Act -

S.M. (1963), c. 88; AMENDED:
S.M. (1964), 2nd sess., c. 10.

Tuberculosis Control Act -

R.S.M. (1954), c. 274; AMENDED:
S.M. (1955), c. 80; S.M. (1959), 2nd
sess., c. 66; S.M. (1961), 1st sess.
c. 21; S.M. (1962), c. 66; S.M.
(1963), c. 89.

Vital Statistics Act -

R.S.M. (1954), c. 283; AMENDED:
S.M. (1956), c. 71; S.M. (1957),
c. 76; S.M. (1959), 2nd sess., c. 68;
S.M. (1961), 1st sess., cc. 21, 64;

S.M. (1963), c. 91; S.M. (1964), 1st
sess., c. 46.

White Cane Act -

S.M. (1961), c. 91.

Workmen's Compensation Act -

R.S.M. (1954), c. 297; AMENDED:
S.M. (1955), c. 84; S.M. (1956),
c. 74; S.M. (1958), 1st sess., c. 75;
S.M. (1959), 2nd sess., cc. 73, 74;
S.M. (1960), c. 85; S.M. (1961), 1st
sess., cc. 70, 71; S.M. (1963),
c. 98; S.M. (1964), 1st sess., c. 60.

LAWS OF THE PROVINCE OF NEW BRUNSWICK*Anatomy Act -*

S.N.B.(1957), c. 4.

Blind Persons Allowances Act -

R.S.N.B.(1952), c. 19; AMENDED:
S.N.B.(1960-61), c. 23.

Blind Workmen's Compensation Act -

R.S.N.B.(1952), c. 20.

Disabled Persons Allowances Act -

S.N.B.(1955), c. 9; AMENDED:
S.N.B.(1960-61), c. 35.

Education of Blind Act -

R.S.N.B.(1952), c. 68; AMENDED:
S.N.B.(1957), c. 36; S.N.B.(1959),
c. 41; S.N.B.(1960), c. 25

*Education of Deaf, Mute, and Deaf Mute
Persons Act -*

R.S.N.B.(1952), c. 69; AMENDED:
S.N.B.(1957), c. 37; S.N.B.(1959),
c. 42; S.N.B.(1960), c. 26; S.N.B.
(1960-61), c. 36; S.N.B.(1961-62),
c. 17.

Fatal Accidents Act -

R.S.N.B.(1952), c. 82; AMENDED:
S.N.B.(1958), c. 35; S.N.B.(1959),
45.

Health Act -

R.S.N.B.(1952), c. 102; AMENDED:
S.N.B.(1954), c. 43; S.N.B.(1955),
c. 51; S.N.B.(1956), c. 38; S.N.B.
(1960-61), c. 48; S.N.B.(1961-62),
c. 58; S.N.B.(1964), c. 33.

Hospital Protection Act -

R.S.N.B.(1952), c. 105.

Hospitals Schools Act -

S.N.B.(1964), c. 3.

Hospitals Services Act -

S.N.B.(1960-61), c. 11.

Human Tissue Act -

S.N.B.(1964), c. 4.

Injurious Insect and Pest Act -

R.S.N.B.(1952), c. 110; AMENDED:
S.N.B.(1957), c. 43.

*Interprovincial School for the Deaf
Agreement Act -*

S.N.B.(1960), c. 7.

Liquor Control Act -

S.N.B.(1961-62), c. 12; AMENDED:
S.N.B.(1963), 2nd. sess., c. 27.

- Liquor Inquiries Act* –
S.N.B.(1960-61), c. 12.
- Mental Incompetency Act* –
R.S.N.B.(1952), c. 144; AMENDED:
S.N.B.(1961-62), c. 61.
- Mentally Retarded Children Act* –
S.N.B.(1958), c. 10; AMENDED:
S.N.B.(1961-62), c. 24.
- Narcotic Addict Act* –
S.N.B.(1961-62), c. 25.
- Polio Clinic and Health Centre Act* –
S.N.B.(1953), c. 11.
- Provincial Hospital Act* –
R.S.N.B.(1952), c. 179; AMENDED:
S.N.B.(1953), c. 25; S.N.B.(1956),
c. 52; S.N.B.(1957), c. 50;
S.N.B.(1960-61), c. 62.
- Public Hospitals Act* –
S.N.B.(1958), c. 11; AMENDED:
S.N.B.(1960), c. 30; S.N.B.(1960-61),
c. 63; S.N.B.(1963), 2nd sess., c. 33.
- Silicosis Compensation Act* –
S.N.B.(1955), c. 7; AMENDED:
S.N.B.(1958), c. 18; S.N.B.(1960),
c. 69; S.N.B.(1960-61), c. 69;
S.N.B.(1963), 2nd. sess., c. 39.
- Tobacco Tax Act* –
R.S.N.B.(1952), c. 231; AMENDED:
S.N.B.(1953), c. 23; S.N.B.(1954),
c. 84; S.N.B.(1960-61), c. 74.
- Tuberculosis Sanatoria Act* –
R.S.N.B.(1952), c. 246; AMENDED:
S.N.B.(1963), c. 24.
- White Cane Act* –
R.S.N.B.(1952), c. 249.
- Workmen's Compensation Act* –
R.S.N.B.(1952), c. 255; AMENDED:
S.N.B.(1953), c. 25; S.N.B.(1955),
c. 81; S.N.B.(1957), c. 68; S.N.B.
(1958), c. 59; S.N.B.(1959), c. 79;
S.N.B.(1960), c. 79; S.N.B.(1961-62),
c. 72; S.N.B.(1963), 2nd. sess., c.44.

LAWS OF THE PROVINCE OF NEWFOUNDLAND

- Accident and Sickness Insurance Act* –
S.N.(1957), No. 30; AMENDED:
S.N.(1959), No. 4; S.N.(1960),
No. 18.
- Alcohol Education Research Act* –
S.N.(1958), No. 38.
- Alcoholic Liquors Act* –
R.S.N.(1952), No. 93; AMENDED:
S.N.(1953), No. 44; S.N.(1954),
No. 47; S.N.(1963), No. 80;
S.N.(1964), No. 84.
- Blind Persons Allowances Act* –
R.S.N.(1952), No. 62; AMENDED:
S.N.(1953), No. 13; S.N.(1957),
No. 48; S.N.(1958), No. 2.
- Blind Workmen's Compensation Act* –
R.S.N.(1952), No. 254.
- Control of Foods Act* –
R.S.N.(1952), No. 30.
- Cornea Transplant Act* –
S.N.(1960), No. 7.
- Dental Act* –
R.S.N.(1952), No. 57; AMENDED:
S.N.(1953), No. 75; S.N.(1957), No.
52; S.N.(1962), No. 5.
- Department of Health Act* –
R.S.N.(1952), No. 17; AMENDED:
S.N.(1964), No. 21.

Disabled Persons Act -

S.N.(1954), No. 74; AMENDED:
S.N.(1955), No. 18; S.N.(1957),
No. 47.

Fatal Accidents Act -

R.S.N.(1952), No. 256.

Food and Drug Act -

R.S.N.(1952), No. 56; AMENDED:
S.N.(1953), No. 32; S.N. (1959), No.
17; S.N.(1962), No. 3.

Health and Public Welfare Act -

R.S.N. (1952), No. 51; AMENDED:
S.N. (1954), No. 22; S.N. (1956),
No. 31; S.N. (1957), No.61; S.N.
(1958), No. 26; S.N. (1959), Nos.
12, 52; S.N. (1960), No. 48; S.N.
(1962), No. 40.

Home for the Aged and Infirm Act -

S.N. (1963), No. 52.

Hospital Insurance (Agreement) Act -

S.N. (1957), No. 60; AMENDED:
S.N. (1960), No. 56.

*Maritime Hospital Association Re.
Incorporation Act -*

S.N. (1949), No. 56; AMENDED:
S.N. (1952), No. 42; S.N. (1957),
No. 50.

*Mentally Incompetent Persons' Estate
Act -*

S.N. (1962), No. 78 (to be pro-
claimed).

Midwifery Act -

R.S.N. (1952), No. 58.

Newfoundland Medical Board Act -

R.S.N. (1952), No. 52; AMENDED:
S.N. (1959), No. 11.

Newfoundland Registered Nurses Act -

S.N. (1953), No. 31.

Nurses Training School Building Act -

S.N. (1960), No. 79.

Optometry Act -

R.S.N. (1952), No. 54.

Pharmaceutical Association Act -

S.N. (1954), No. 51; AMENDED:
S.N. (1959), No. 10.

Tobacco Tax Act -

S.N. (1964), No. 81.

Venereal Disease Prevention Act -

R.S.N. (1952), No. 59.

Water Protection Act -

S.N. (1964), No. 36.

White Cane Act -

S.N. (1956), No. 20.

Workmen's Compensation Act -

S.N. (1962), No. 32; AMENDED:
S.N. (1964), Nos. 57, 67.

ORDINANCES OF THE NORTH WEST TERRITORIES*Cornea Transplant Ordinance -*

O.N.W.T. (1962), 2nd sess., c. 3.

Dental Profession Ordinance -

R.O.N.W.T. (1956), c. 22.

O.N.W.T. (1957), 2nd sess., c. 3;

O.N.W.T. (1958), 1st sess., c. 4;

O.N.W.T. (1962), 2nd sess., c. 4;

O.N.W.T. (1964), 1st sess., c. 3.

Disabled Persons Allowance Ordinance - Fatal Accidents Ordinance -

R.O.N.W.T. (1956), c. 25; AMENDED: R.O.N.W.T. (1956), c. 34.

Fitness and Amateur Sport Agreement Ordinance -

O.N.W.T. (1963), 1st sess., c. 3.

Insane Persons Ordinance -

R.O.N.W.T. (1956), c. 50; AMENDED:
O.N.W.T. (1957), 1st sess., c. 2;
O.N.W.T. (1960), 2nd sess., c. 3;
O.N.W.T. (1962), 2nd sess., c. 8.

Liquor Ordinance -

R.O.N.W.T. (1956), c. 60; AMENDED:
R.N.W.T. (1956), 2nd sess., cc. 4,
12; O.N.W.T. (1957), 1st sess., c. 4;
O.N.W.T. (1957), 2nd sess., c. 6;
O.N.W.T. (1958), 1st sess., c. 8;
O.N.W.T. (1960), 1st sess., c. 4;
O.N.W.T. (1960), 2nd sess., c. 5;
O.N.W.T. (1961), 2nd sess., cc. 9,
10; O.N.W.T. (1962), 1st sess., c. 6;
O.N.W.T. (1962), 2nd sess., c. 10;
O.N.W.T. (1963), 2nd sess., c. 14;
O.N.W.T. (1964), 2nd sess., c. 2.

Medical Profession Ordinance -

R.O.N.W.T. (1956), c. 68.

Old Age Assistance and Blind Persons Allowances Ordinance -

R.O.N.W.T. (1956), c. 74; AMENDED:
O.N.W.T. (1957), 2nd sess., c. 2;
O.N.W.T. (1958), 1st sess., c. 3;
O.N.W.T. (1962), 2nd sess., c. 12;
O.N.W.T. (1964), 1st sess., c. 10.

Pharmaceutical Chemists Ordinance -

R.O.N.W.T. (1956), c. 77; AMENDED:
O.N.W.T. (1960), 2nd sess., c. 7;
O.N.W.T. (1963), 2nd sess., c. 21;
O.N.W.T. (1964), 1st sess., c. 11.

Public Health Ordinance -

O.N.W.T. (1957), 1st sess., c. 7;
AMENDED: O.N.W.T. (1961), 2nd
sess., c. 14; O.N.W.T. (1962), 2nd
sess., c. 14.

Public Health Agreement Ordinance -

O.N.W.T. (1962), 2nd sess., c. 15.

Territorial Hospital Insurance Services Ordinance -

O.N.W.T. (1959), 2nd sess., c. 3.

Vital Statistics Ordinance -

R.O.N.W.T. (1956), c. 96; AMENDED:
O.N.W.T. (1957), c. 8.

Workmen's Compensation Ordinance -

R.O.N.W.T. (1956), c. 100;
AMENDED: O.N.W.T. (1956), 2nd
sess., c. 9; O.N.W.T. (1958), 1st
sess., c. 5; O.N.W.T. (1958), 2nd
sess., c. 8; O.N.W.T. (1959), 2nd
sess., c. 5; O.N.W.T. (1961), 2nd
sess., c. 16; O.N.W.T. (1962), 1st
sess., c. 11.

LAWS OF THE PROVINCE OF NOVA SCOTIA*Alcoholism Research Foundation Act – Blind Persons' Allowances Act –*

S.N.S. (1959), c. 2; AMENDED:
S.N.S. (1960), c. 60;
S.N.S. (1962), c. 60.

R.S.N.S. (1954), c. 23; AMENDED:
S.N.S. (1957), c. 16.

Anatomy Act –

R.S.N.S. (1954), c. 8; AMENDED:
S.N.S. (1964), c. 16.

Blind Workmen's Compensation Act –

R.S.N.S. (1954), c. 24.

Brucellosis Control Act –

S.N.S. (1955), c. 3.

Dental Act —

R.S.N.S.(1954), c. 68; AMENDED:
S.N.S.(1956), cc. 21,22;
S.N.S.(1957), c.21;S.N.S.(1960), c.27.

Disabled Persons Allowances Act —

R.S.N.S.(1954), c. 70.

Education of the Blind Act —

R.S.N.S.(1954), c. 79; AMENDED:
S.N.S.(1957), c.24;S.N.S.(1961),c.25.

Fatal Injuries Act —

R.S.N.S.(1954), c. 94; AMENDED:
S.N.S.(1956), c. 26.

Hospital Insurance Act —

S.N.S.(1958) c. 3; AMENDED:
S.N.S.(1962), c. 57.

Hospital Services Planning Commission Act —

S.N.S.(1957), c.3.

Hospital Tax Act —

S.N.S.(1958), c. 4; AMENDED:
S.N.S.(1960), c. 53; S.N.S.(1961),
c. 55.

Human Tissue Act —

S.N.S.(1964), c. 5.

Incompetent Persons Act —

R.S.N.S.(1954), c. 162; AMENDED:
S.N.S.(1960), c. 39.

Inebriate Guardianship Act —

R.S.N.S.(1954), c. 127.

Institutions for the Insane Act —

R.S.N.S.(1954), c. 132.

Interprovincial School for the Deaf Act —

S.N.S.(1960), c. 7; AMENDED:
S.N.S.(1961), c.63; S.N.S.(1963),
c. 47.

Liquor Control Act —

R.S.N.S. (1954), c. 155; AMENDED:
S.N.S.(1955), c.30; S.N.S.(1957),c.31;
S.N.S.(1958),c.42; S.N.S.(1961),c.35;
S.N.S.(1962),c.33; S.N.S.(1964), c.32.

Local Asylums Act —

R.S.N.S.(1954), c.160; AMENDED:
S.N.S.(1958), c.43; S.N.S.(1959),
c.22; S.N.S.(1960), c.38; S.N.S.
(1961), c. 36.

Medical Act —

R.S.N.S.(1954), c.179; AMENDED:
S.N.S.(1956), c. 28; S.N.S.(1959),
c.23; S.N.S.(1961), c. 37.

Medical Examiners Act —

R.S.N.S.(1954), c. 173.

Municipal Hospitals Loan Act —

S.N.S.(1959), c. 5; AMENDED:
S.N.S.(1962), c.61; S.N.S.(1964), c. 61.

Narcotic Drug Addicts Act —

R.S.N.S.(1954), c. 197.

Nova Scotia Hospital Act —

S.N.S.(1960), c. 8.

Nova Scotia Sanatorium Act —

R.S.N.S.(1954), c. 204.

Nursing Assistants Act —

R.S.N.S.(1954), c. 205.

Optometry Act —

S.N.S.(1961), c. 6.

Physiotherapy Act —

S.N.S.(1958), c. 10.

Public Charities Act —

R.S.N.S.(1954), c. 233.

Public Health Act —

S.N.S.(1962), c. 13; AMENDED:
S.N.S.(1964), c. 68.

Public Hospitals Act —

S.N.S.(1958), c. 11; AMENDED:
S.N.S.(1959), c.54; S.N.S.(1961),
c. 59; S.N.S. (1964), c. 59.

Registered Nurses' Association Act —

R.S.N.S.(1954), c. 247.

Vital Statistics Act —

R.S.N.S.(1954), c. 308; AMENDED:

S.N.S.(1956), c. 45; S.N.S.(1959),
c. 45; S.N.S.(1962) c. 53;
S.N.S.(1963), c. 53.

White Cane Act –

R.S.N.S.(1954), c. 314.

Workmen's Compensation Act –

R.S.N.S.(1954), c. 319; AMENDED:

S.N.S.(1956), c. 49;
S.N.S. (1957), c. 57;
S.N.S. (1958), c. 71;
S.N.S.(1960), c. 50;
S.N.S. (1961), c. 51;
S.N.S. (1962), c. 56.

LAWS OF THE PROVINCE OF PRINCE EDWARD ISLAND

Blind Persons Act –

c. 154.¹

Deaf and Dumb Relief Act –

c. 40.

Fatal Accidents Act –

c. 57.

Health Tax Act –

c. 71.

Hospital Act –

c. 74.

Medical Act –

S.P.E.I. (1952), c. 31.

Chancery Act –

c. 21 (mental health).

Falconwood Act –

c. 56 (mental health).

Nurses Act –

c. 122.

Optometry Act –

c. 105.

Pharmacy Act –

c. 110.

Premarital Health Examination Act –

c. 119.

Public Health Act –

c. 129.

Rehabilitation of Disabled Persons Act–

S.P.E.I. (1954), c. 31.

Temperance Act –

c. 159.

Venereal Disease Prevention Act –

c. 69.

Vital Statistics Act –

c. 172.

White Cane Act –

c. 175.

Workmen's Compensation Act –

c. 178.

¹ Most references are to the Revised Statutes of P.E.I., 1951; we indicate, therefore, simply the chapter; there are but two exceptions: "The Medical Act" and "The Rehabilitation of Disabled Persons Act".

LAWS OF THE PROVINCE OF SASKATCHEWAN

- Air Pollution Control Act* –
S.S. (1965), c. 65.
- Anatomy Act* –
R.S.S. (1953), c. 274.
- Blind Persons Allowances Act* –
R.S.S. (1953), c. 243; AMENDED:
S.S. (1955), c. 59.
- Blind Workmen's Compensation Act* –
R.S.S. (1953), c. 259.
- Cancer Control Act* –
R.S.S. (1953), c. 234; AMENDED:
S.S. (1958), c. 35; S.S. (1961),
c. 51.
- Chiropody Profession Act* –
R.S.S. (1953), c. 299; AMENDED:
S.S. (1957), c. 79; S.S. (1959), c. 91;
S.S. (1961), c. 64.
- Cornea Transplant Act* –
S.S. (1962), c. 1.
- Dental Profession Act* –
R.S.S. (1953), c. 281; AMENDED:
S.S. (1954), c. 73; S.S. (1959), c.
108; S.S. (1960), c. 70; S.S. (1963),
c. 65.
- Dental Technicians Act* –
S.S. (1960), c. 71.
- Department of Public Health Act* –
R.S.S. (1953), c. 29.
- Disabled Persons' Allowances Act* –
S.S. (1954), c. 62; AMENDED:
S.S. (1955), c. 60.
- Drugless Practitioners Act* –
R.S.S. (1940), c. 222; AMENDED:
S.S. (1943), c. 49; S.S. (1944), c. 68.
- Education and Hospitalization Tax Act* –
R.S.S. (1953), c. 61; AMENDED:
S.S. (1955), c. 24; S.S. (1957), c. 25;
S.S. (1959), c. 26; S.S. (1961), c. 56;
- S.S. (1961), 2nd sess., c. 3;
S.S. (1963), c. 33; S.S. (1965), c. 24.
- Education of Blind and Deaf Children
Act* –
R.S.S. (1953), c. 244; AMENDED:
S.S. (1955), c. 61.
- Education of Blind and Deaf Persons
Act* –
R.S.S. (1953), c. 177.
- Fatal Accidents Act* –
R.S.S. (1953), c. 102; AMENDED:
S.S. (1959), c. 8.
- Health Services Act* –
R.S.S. (1953), c. 231; AMENDED:
S.S. (1956), c. 46; S.S. (1958), c.
81; S.S. (1962), c. 3; S.S. (1963), c.
67; S.S. (1965), c. 59.
- Hospital Standards Act* –
R.S.S. (1953), c. 238; AMENDED:
S.S. (1956), c. 48; S.S. (1957), c.
69; S.S. (1958), c. 33; S.S. (1959),
c. 46; S.S. (1964), c. 36; S.S.
(1965), c. 60.
- Liquor Act* –
R.S.S. (1953), c. 348; AMENDED:
S.S. (1955), c. 83; S.S. (1958), cc.
98, 99; S.S. (1959), c. 18; S.S.
(1960), c. 31; S.S. (1961), c. 22;
S.S. (1963), c. 30; S.S. (1965), c.
74.
- Liquor Exporters Taxation Act* –
R.S.S. (1953), c. 60.
- Liquor Licencing Act* –
S.S. (1959), c. 19; AMENDED:
S.S. (1960), c. 32; S.S. (1961), c.
23; S.S. (1963), c. 48; S.S. (1965),
c. 75.
- Lunacy Act* –
R.S.S. (1953), c. 310; AMENDED:
S.S. (1963), c. 11.

- Medical Profession Act* –
R.S.S. (1953), c. 273; AMENDED:
S.S. (1965), c. 83.
- Mental Health Act* –
S.S. (1961), c. 68; AMENDED:
S.S. (1963), c. 36.
- Minors Tobacco Act* –
R.S.S. (1953), c. 347.
- Mutual Medical and Hospital Benefit Association Act* –
R.S.S. (1953), c. 135; AMENDED:
S.S. (1962), c. 32; S.S. (1963), c. 42.
- Naturopathy Act* –
S.S. (1954), c. 75; AMENDED:
S.S. (1955), c. 74.
- Optometry Act* –
R.S.S. (1953), c. 287; AMENDED:
S.S. (1956), c. 60; S.S. (1963), c. 62.
- Osteopathic Practice Act* –
R.S.S. (1953), c. 288.
- Pest Control Act* –
S.S. (1956), c. 42; AMENDED:
S.S. (1959), c. 82; S.S. (1965), c. 9.
- Pharmacy Act* –
R.S.S. (1953), c. 282; AMENDED:
S.S. (1954), c. 74; S.S. (1955), c. 71;
S.S. (1965), c. 84.
- Physical Fitness Act* –
R.S.S. (1953), c. 182; AMENDED:
S.S. (1962), c. 25.
- Physical Therapists Act* –
R.S.S. (1953), c. 290; AMENDED:
S.S. (1954), c. 76; S.S. (1957), c. 80.
- Pollution of Waters (Prevention) Act* –
S.S. (1962), c. 19.
- Psychiatric Nurses Act* –
R.S.S. (1953), c. 285; AMENDED:
S.S. (1955), c. 73.
- Public Health Act* –
R.S.S. (1953), c. 230; AMENDED:
S.S. (1954), c. 58; S.S. (1957), c. 67;
S.S. (1965), c. 58.
- Radiological Health Act* –
S.S. (1961), c. 17.
- Registered Nurses Act* –
R.S.S. (1953), c. 284; AMENDED:
S.S. (1955), c. 72.
- Registered Psychologists Act* –
S.S. (1962), c. 53.
- Rehabilitation Act* –
S.S. (1953), c. 105.
- Saskatchewan Health Insurance Act* –
R.S.S. (1953), c. 233.
- Saskatchewan Hospitalization Act* –
R.S.S. (1953), c. 232; AMENDED:
S.S. (1955), c. 54; S.S. (1957), c.
68; S.S. (1958), c. 32; S.S. (1959), c.
80; S.S. (1963), c. 68; S.S. (1965),
c. 61.
- Saskatchewan Medical Care Insurance Act* –
S.S. (1961), 2nd sess., c. 1; AMEN-
DED: S.S. (1962), c. 68; S.S. (1962),
2nd sess., c. 1; S.S. (1965), c. 62.
- Tobacco Tax Act* –
S.S. (1965), c. 26.
- Tuberculosis Sanatoria and Hospitals Act* –
R.S.S. (1953), c. 235; AMENDED:
S.S. (1956), c. 47; S.S. (1960), c.
39.
- Tuberculosis Sanatoria Superannuation Act* –
R.S.S. (1953), c. 376; AMENDED:
S.S. (1958), c. 67; S.S. (1963), c.
82.
- University Hospital Act* –
R.S.S. (1953), c. 369; AMENDED:
S.S. (1954), c. 91; S.S. (1961), c. 8.

Venereal Disease Prevention Act –

R.S.S. (1953), c. 236.

Vital Statistics Act –

R.S.S. (1953), c. 44; AMENDED:

S.S. (1957), c. 15; S.S. (1960), c. 30.

White Cane Act –

R.S.S. (1953), c. 246.

Workmen's Compensation Act –

R.S.S. (1953), c. 255; AMENDED:

S.S. (1954), c. 64; S.S. (1955), c. 63.

X-Ray Technicians Act –

S.S. (1957), c. 81.

ORDINANCES OF THE YUKON*Chiropractic Ordinance –*

R.O.Y. (1958), c. 15.

Cornea Transplant Ordinance –

O.Y. (1962), c. 2.

Dental Profession Ordinance –

R.O.Y. (1958), c. 29; AMENDED:

O.Y. (1964), 2nd sess., c. 10.

Disabled Persons Allowance Ordinance –

R.O.Y. (1958), c. 31; AMENDED:

O.Y. (1962), 1st sess., c. 16;

O.Y. (1964), 1st sess., c. 4.

Fatal Accidents Ordinance –

R.O.Y. (1958), c. 40.

Fitness and Amateur Sport Ordinance –

O.Y. (1962), 5th. sess., c. 1.

Insane Persons Ordinance –

R.O.Y. (1958), c. 56.

Liquor Ordinance –

R.O.Y. (1958), c. 67; AMENDED:

O.Y. (1959), 1st. sess., c. 6;

O.Y. (1961), 2nd. sess., c. 6;

O.Y. (1962), 1st. sess., c. 18;

O.Y. (1962) 5th. sess., cc. 11, 14;

O.Y. (1963), 1st. sess., cc. 9, 12;

O.Y. (1964), 1st. sess., c. 12.

Medical Profession Ordinance –

R.O.Y. (1958), c. 73; AMENDED:

O.Y. (1963), 2nd sess., c. 7;

O.Y. (1964), 1st. sess., c. 11.

Old Age Assistance and Blind Persons Allowance Ordinance –

R.O.Y. (1958), c. 82; AMENDED:

O.Y. (1961), 1st. sess., c. 2;

O.Y. (1962), 1st. sess., c. 17;

O.Y. (1964), 1st. sess., c. 3.

Optometry Ordinance –

R.O.Y. (1958), c. 83.

Pharmaceutical Chemists Ordinance –

R.O.Y. (1958), c. 87.

Public Health Ordinance –

R.O.Y. (1958), c. 92; AMENDED:

O.Y. (1959), 1st. sess., c. 8;

O.Y. (1961), 1st. sess., c. 9;

O.Y. (1962), 5th sess., c. 12.

Vital Statistics Ordinance –

R.O.Y. (1958), c. 106.

Workmen's Compensation Ordinance –

R.O.Y. (1958), c. 111; AMENDED:

O.Y. (1959), 1st. sess., c. 9;

O.Y. (1961), 2nd sess., c. 8.

Yukon Hospital Insurance Services Ordinance –

O.Y. (1960), 1st sess., c. 2.

APPENDIX C

TABLES

TABLE 1

CANADA'S POPULATION 1867-1991

| Year | Population '000 | Year | Population '000 | Year | Population '000 |
|------|--------------------|------|--------------------|------|--------------------|
| 1867 | 3,463 | 1901 | 5,371 | 1941 | 11,507 |
| 1868 | 3,511 | 1902 | 5,494 | 1942 | 11,654 |
| 1869 | 3,565 | 1903 | 5,651 | 1943 | 11,795 |
| 1870 | 3,625 | 1904 | 5,827 | 1944 | 11,946 |
| | | 1905 | 6,002 | 1945 | 12,072 |
| 1871 | 3,689 | | | | |
| 1872 | 3,754 | 1906 | 6,197 | 1946 | 12,292 |
| 1873 | 3,826 | 1907 | 6,411 | 1947 | 12,551 |
| 1874 | 3,895 | 1908 | 6,625 | 1948 | 12,823 |
| 1875 | 3,954 | 1909 | 6,800 | 1949 | 13,447 |
| 1876 | 4,009 | 1910 | 6,988 | 1950 | 13,712 |
| 1877 | 4,064 | 1911 | 7,207 | 1951 | 14,009 |
| 1878 | 4,120 | 1912 | 7,389 | 1952 | 14,459 |
| 1879 | 4,185 | 1913 | 7,632 | 1953 | 14,845 |
| 1880 | 4,255 | 1914 | 7,879 | 1954 | 15,287 |
| | | 1915 | 7,981 | 1955 | 15,698 |
| 1881 | 4,325 | | | | |
| 1882 | 4,375 | 1916 | 8,001 | 1956 | 16,081 |
| 1883 | 4,430 | 1917 | 8,060 | 1957 | 16,610 |
| 1884 | 4,487 | 1918 | 8,148 | 1958 | 17,080 |
| 1885 | 4,537 | 1919 | 8,311 | 1959 | 17,483 |
| | | 1920 | 8,556 | 1960 | 17,870 |
| 1886 | 4,580 | | | | |
| 1887 | 4,626 | 1921 | 8,788 | 1961 | 18,238 |
| 1888 | 4,678 | 1922 | 8,919 | 1962 | 18,570 |
| 1889 | 4,729 | 1923 | 9,010 | 1963 | 18,896 |
| 1890 | 4,779 | 1924 | 9,143 | 1964 | 19,237 |
| | | 1925 | 9,294 | | |

TABLE 1 (Concluded)
CANADA'S POPULATION 1867-1991

| Year | Population '000 | Year | Population '000 | Year | Population '000 |
|------|--------------------|------|--------------------|------|--------------------|
| 1891 | 4,833 | | | | |
| 1892 | 4,883 | 1926 | 9,451 | 1966 | 20,297 |
| 1893 | 4,931 | 1927 | 9,686 | | |
| 1894 | 4,979 | 1928 | 9,835 | 1971 | 22,590 |
| 1895 | 5,026 | 1929 | 10,029 | | |
| | | 1930 | 10,208 | 1976 | 25,234 |
| 1896 | 5,074 | | | | |
| 1897 | 5,122 | 1931 | 10,376 | 1981 | 28,247 |
| 1898 | 5,175 | 1932 | 10,510 | | |
| 1899 | 5,235 | 1933 | 10,633 | 1986 | 31,546 |
| 1900 | 5,301 | 1934 | 10,741 | | |
| | | 1935 | 10,845 | 1991 | 35,107 |
| | | 1936 | 10,950 | | |
| | | 1937 | 11,045 | | |
| | | 1938 | 11,152 | | |
| | | 1939 | 11,267 | | |
| | | 1940 | 11,381 | | |

Source: Based on Dominion Bureau of Statistics, *Canada Yearbook*, Ottawa: Queen's Printer, successive issues, and Stukel, A., "Population Projections 1961-1991", Appendix E in Brown, T.M., *Canadian Economic Growth*, a study prepared for the Royal Commission on Health Services, Ottawa: Queen's Printer, 1965 (assuming annual net immigration of 50,000).

TABLE 2¹
POPULATION, ITS ANNUAL INCREASE, NATURAL INCREASE,
AND RESIDUAL,² CANADA, 1921-1963

| | 1 | 2 | 3 | 4 |
|-------------------------|--------------------|---------------------------------------|-----------------------------|---------------------------|
| Year | Population '000 | Total Annual Pop. Increase '000 | Natural Increase '000 | Residual (2-3) '000 |
| 1920..... | 8,556 | | | |
| 1921..... | 8,788 | 232 | 160 | 72 |
| 1922..... | 8,919 | 131 | 154 | -23 |
| 1923..... | 9,010 | 91 | 139 | -48 |
| 1924..... | 9,143 | 133 | 149 | -16 |
| 1925..... | 9,294 | 151 | 147 | 4 |
| 1926..... | 9,451 | 157 | 129 | 28 |
| 1927..... | 9,637 | 186 | 132 | 54 |
| 1928..... | 9,835 | 198 | 130 | 68 |
| 1929..... | 10,029 | 194 | 125 | 69 |
| 1930..... | 10,208 | 179 | 137 | 42 |
| 1931..... | 10,376 | 168 | 139 | 29 |
| 1932..... | 10,510 | 134 | 135 | -1 |
| 1933..... | 10,633 | 123 | 124 | -1 |
| 1934..... | 10,741 | 108 | 123 | -15 |
| 1935..... | 10,845 | 104 | 119 | -5 |
| 1936..... | 10,950 | 105 | 117 | -12 |
| 1937..... | 11,045 | 95 | 110 | -15 |
| 1938..... | 11,152 | 107 | 126 | -19 |
| 1939..... | 11,267 | 115 | 125 | -10 |
| 1940..... | 11,381 | 114 | 138 | -24 |
| 1941..... | 11,507 | 126 | 145 | -19 |
| 1942..... | 11,654 | 147 | 164 | -17 |
| 1943..... | 11,795 | 141 | 170 | -29 |
| 1944..... | 11,946 | 151 | 174 | -23 |
| 1945..... | 12,072 | 126 | 183 | -57 |
| 1946..... | 12,292 | 220 | 225 | -5 |
| 1947..... | 12,551 | 259 | 251 | 8 |
| 1948..... | 12,823 | 272 | 237 | 35 |
| 1949 ³ | 13,447 | 624 | 243 | 381 |
| 1950..... | 13,712 | 265 | 248 | 17 |
| 1951..... | 14,009 | 297 | 255 | 42 |
| 1952..... | 14,459 | 450 | 277 | 173 |
| 1953..... | 14,845 | 386 | 290 | 96 |
| 1954..... | 15,287 | 442 | 311 | 131 |
| 1955..... | 15,698 | 411 | 314 | 97 |
| 1956..... | 16,081 | 383 | 319 | 64 |
| 1957..... | 16,610 | 529 | 333 | 196 |
| 1958..... | 17,080 | 470 | 335 | 135 |
| 1959..... | 17,483 | 403 | 339 | 64 |
| 1960..... | 17,870 | 387 | 339 | 48 |
| 1961..... | 18,238 | 368 | 335 | 33 |
| 1962..... | 18,570 | 332 | 326 | 6 |
| 1963..... | 18,896 | 326 | 318 | 8 |

¹Based on Dominion Bureau of Statistics, *Canada Year Book*, Ottawa: Queen's Printer, successive years.

²Generally net migration.

³Entry of Newfoundland (population 345,000).

TABLE 3
POPULATION BY AGE GROUPS AND SEX, AND PERCENTAGE DISTRIBUTION,
CANADA, CENSUS YEARS 1901-1991

| Year | Age Group | | | | | | |
|------------------|-----------|----------|------------|----------|-----------|----------|------------|
| | 0-14 | | 15-64 | | 65+ | | Total |
| | Number | Per Cent | Number | Per Cent | Number | Per Cent | |
| 1901 Total | 1,839,223 | 34.3 | 3,213,627 | 59.8 | 269,388 | 5.0 | 5,371,315 |
| Male | 931,104 | 33.8 | 1,652,990 | 60.1 | 137,848 | 5.0 | 2,751,708 |
| Female | 908,119 | 34.7 | 1,560,637 | 59.5 | 131,540 | 5.0 | 2,619,607 |
| 1911 Total | 2,371,047 | 32.9 | 4,465,150 | 60.0 | 333,763 | 4.6 | 7,206,643 |
| Male | 1,198,175 | 31.3 | 2,427,528 | 63.6 | 169,605 | 4.4 | 3,821,995 |
| Female | 1,172,872 | 34.7 | 2,037,622 | 60.2 | 164,158 | 4.8 | 3,384,648 |
| 1921 Total | 3,019,330 | 34.3 | 5,328,267 | 60.7 | 419,090 | 4.8 | 8,787,949 |
| Male | 1,523,335 | 33.7 | 2,780,363 | 61.4 | 214,357 | 4.7 | 4,529,643 |
| Female | 1,495,995 | 35.1 | 2,547,904 | 59.9 | 204,733 | 4.8 | 4,258,306 |
| 1931 Total | 3,281,215 | 31.6 | 6,515,969 | 62.6 | 575,831 | 5.6 | 10,376,786 |
| Male | 1,658,609 | 30.9 | 3,418,844 | 63.5 | 294,377 | 5.4 | 5,374,541 |
| Female | 1,622,606 | 32.4 | 3,079,125 | 62.0 | 281,454 | 5.6 | 5,002,245 |
| 1941 Total | 3,198,551 | 27.8 | 7,540,289 | 65.5 | 767,815 | 6.7 | 11,506,655 |
| Male | 1,619,299 | 27.4 | 3,890,328 | 66.0 | 390,909 | 6.6 | 5,900,536 |
| Female | 1,579,252 | 28.1 | 3,649,961 | 65.1 | 376,906 | 6.7 | 5,606,119 |
| 1951 Total | 4,250,717 | 30.4 | 8,672,439 | 61.8 | 1,086,273 | 7.8 | 14,009,429 |
| Male | 2,168,058 | 30.6 | 4,369,512 | 61.6 | 551,303 | 7.8 | 7,088,873 |
| Female | 2,082,659 | 30.1 | 4,302,927 | 62.1 | 534,970 | 7.8 | 6,920,556 |
| 1961 Total | 6,191,922 | 33.9 | 10,655,171 | 58.5 | 1,391,154 | 7.6 | 18,238,247 |
| Male | 3,166,091 | 34.3 | 5,378,685 | 58.3 | 674,117 | 7.4 | 9,218,893 |
| Female | 3,025,831 | 33.6 | 5,276,486 | 58.5 | 717,037 | 7.9 | 9,019,354 |

| | | | | | | | | |
|------------------|------------|------|------------|------|-----------|------|------------|-------|
| 1971 Total | 7,379,600 | 32.7 | 13,421,600 | 59.4 | 1,788,300 | 7.9 | 22,589,500 | 100.0 |
| Male | 3,775,800 | 33.2 | 6,759,500 | 59.5 | 825,100 | 7.3 | 11,360,400 | 100.0 |
| Female | 3,603,800 | 32.1 | 6,662,100 | 59.3 | 963,200 | 8.6 | 11,229,100 | 100.0 |
| 1981 Total | 9,434,000 | 33.4 | 16,429,000 | 58.2 | 2,383,700 | 8.4 | 28,246,700 | 100.0 |
| Male | 4,831,800 | 34.1 | 8,275,000 | 58.4 | 1,066,300 | 7.5 | 14,173,100 | 100.0 |
| Female | 4,602,200 | 32.7 | 8,154,000 | 57.9 | 1,317,400 | 9.4 | 14,073,600 | 100.0 |
| 1991 Total | 11,846,000 | 33.7 | 20,140,700 | 57.4 | 3,120,000 | 8.9 | 35,106,700 | 100.0 |
| Male | 6,071,300 | 34.5 | 10,187,600 | 57.9 | 1,341,900 | 7.6 | 17,600,800 | 100.0 |
| Female | 5,774,700 | 33.0 | 9,953,100 | 56.8 | 1,778,100 | 10.2 | 17,505,900 | 100.0 |

Source: Based on Dominion Bureau of Statistics, Census of Canada, Ottawa: Queen's Printer, various years, and Stukel, A., "Population Projections 1961-1991", Appendix E, in Brown, T. M., Canadian Economic Growth, a study prepared for the Royal Commission on Health Services, Ottawa: Queen's Printer, 1965 (projections assuming net immigration of 50,000).

TABLE 4
ESTIMATED HEALTHY LIFETIME LOST
DUE TO PREMATURE DEATH, DISABLING AND NON- DISABLING ILLNESS,
BY DIAGNOSTIC CLASS, CANADA, 1961
(in '000 man years)

| Diagnostic Class | Pre- mature Death | Disabling Illness | Non- Disabling Illness | Total |
|--|-------------------------|----------------------|------------------------------|-------|
| 1. Infective and parasitic diseases..... | 201 | 66 | 17 | 284 |
| 2. Neoplasms | 158 | 14 | 9 | 181 |
| 3. Allergic, endocrine system, metabolic, and nutritional diseases..... | 31 | 9 | 29 | 69 |
| 4. Diseases of the blood and blood-forming organs | 5 | n.a. | n.a. | 5 |
| 5. Mental, psychoneurotic, and personality disorders..... | 7 | 69 | n.a. | 76 |
| 6. Diseases of the nervous system and sense organs | 84 | 44 | 32 | 160 |
| 7. Diseases of the circulatory system | 219 | 63 | 62 | 344 |
| 8. Diseases of the respiratory system | 175 | 195 | 136 | 506 |
| 9. Diseases of the digestive system..... | 148 | 48 | 50 | 246 |
| 10. Diseases of the genito-urinary system | 40 | 24 | 29 | 93 |
| 11. Maternity and complications | 25 | 17 | 3 | 45 |
| 12. Diseases of the skin and cellular tissue | 2 | 11 | 32 | 45 |
| 13. Diseases of the bones and organs of movement | 7 | 40 | 58 | 105 |
| 14. Congenital malformations..... | 72 | n.a. | n.a. | 72 |
| 15. Certain diseases of early infancy..... | 278 | n.a. | n.a. | 278 |
| 16. Symptoms, senility, and ill-defined conditions | 24 | 57 | 99 | 180 |
| 17. Accidents, poisoning, and violence | 194 | 40 | 26 | 260 |
| Total | 1,670 | 697 | 582 | 2,949 |

Note: Premature Death - Estimated number of persons who would be alive in 1961, had they not died since 1926 before reaching the age of 70 (cut-off in 1926 because of lack of data for earlier years). For those dying prematurely during 1961, half a year was counted.

Disabling Illness - Estimates based on Canadian Sickness Survey rates, mental and tuberculosis hospital data.

Non-disabling Illness - One quarter of the duration of non-disabling illness estimated based on Canadian Sickness Survey rates.

The areas of underestimate due to lack of data should be noted. This applies particularly to class 5 (mental disorders) where no estimate is available for non-disabling illness and disabling illness outside hospitals, both of which are probably very sizeable.

TABLE 5
NUMBER AND DISTRIBUTION OF DEATHS, BY DIAGNOSTIC CLASS,
CANADA, 1961

| Diagnostic Class | Number | Per Cent |
|---|---------|----------|
| 1. Infective and parasitic diseases | 1,578 | 1.2 |
| of these, tuberculosis only | 769 | 0.5 |
| 2. Neoplasms | 23,961 | 17.0 |
| of these, all malignant neoplasms | 23,650 | 16.8 |
| 3. and 4. Allergic disorders and endocrine, metabolic, and blood diseases | 3,620 | 2.6 |
| 5. Mental, psychoneurotic, and personality disorders | 467 | 0.3 |
| 6. Diseases of the nervous system and sense organs | 17,057 | 12.1 |
| 7. Diseases of the circulatory system | 54,786 | 38.8 |
| 8. Diseases of the respiratory system | 8,022 | 5.7 |
| 9. Diseases of the digestive system | 5,278 | 3.7 |
| 10. Diseases of the genito-urinary system | 2,984 | 2.1 |
| 11. Maternity and complications | 219 | 0.2 |
| 12. and 13. Diseases of the skin and musculoskeletal system | 583 | 0.4 |
| 14. Congenital malformations | 2,822 | 2.0 |
| 15. Certain diseases of early infancy | 7,159 | 5.1 |
| 16. Symptoms, senility, and ill-defined conditions | 1,220 | 0.9 |
| 17. Accidents, poisoning, and violence | 11,229 | 7.9 |
| Total | 140,985 | 100.0 |

Source: Based on Dominion Bureau of Statistics, Vital Statistics 1961, Ottawa: Queen's Printer, 1963.

TABLE 6
PREMATURE MORTALITY,
ESTIMATED NUMBER AND DISTRIBUTION OF LIFE YEARS LOST,
BY DIAGNOSTIC CLASS, CANADA, 1961

| Diagnostic Class | Number | Per Cent |
|---|-----------|----------|
| 1. Infective and parasitic diseases | 35,600 | 1.8 |
| of these, tuberculosis only | 11,880 | 0.6 |
| 2. Neoplasms | 271,300 | 13.7 |
| of these, malignant neoplasms only | 271,260 | 13.7 |
| 3. Allergic, endocrine system, metabolic and nutritional diseases. | 35,600 | 1.8 |
| 4. Diseases of the blood and blood-forming organs | 5,900 | 0.3 |
| 5. Mental, psychoneurotic and personality disorders | 9,900 | 0.5 |
| 6. Diseases of the nervous system and sense organs | 146,500 | 7.4 |
| 7. Diseases of the circulatory system | 435,600 | 22.0 |
| 8. Diseases of the respiratory system | 142,600 | 7.2 |
| 9. Diseases of the digestive system | 85,200 | 4.3 |
| 10. Diseases of the genito-urinary system | 29,700 | 1.5 |
| 11. Maternity and complications | 5,900 | 0.3 |
| 12. Diseases of the skin and cellular tissue | 2,000 | 0.1 |
| 13. Diseases of the bones and organs of movement | 5,900 | 0.3 |
| 14. Congenital malformations | 128,700 | 6.5 |
| 15. Certain diseases of early infancy | 344,500 | 17.4 |
| 16. Symptoms, senility, and ill-defined conditions | 11,900 | 0.6 |
| 17. Accidents, poisoning, and violence | 283,200 | 14.3 |
| Total | 1,980,000 | 100.0 |

Source: Based on tabulations prepared by the Vital Statistics Division, Dominion Bureau of Statistics.

(Note: Deaths occurring under age 70 are considered premature and the difference between age at death and age 70 as the life years lost.)

TABLE 7
ESTIMATED NUMBER AND DISTRIBUTION OF DAYS
OF DISABLING AND NON - DISABLING ILLNESS,
BY DIAGNOSTIC CLASS, CANADA, 1961

| Diagnostic Class | Disabling Illness | | Non - disabling Illness | |
|--|-------------------|----------|-------------------------|----------|
| | Days | Per Cent | Days | Per Cent |
| 1. Infective and parasitic diseases | 24,074,000 | 9.5 | 25,252,000 | 3.0 |
| of these, tuberculosis only | 3,322,000 | 1.3 | n.a. | n.a. |
| 2. Neoplasms | 5,012,000 | 2.0 | 12,652,000 | 1.4 |
| of these, malignant neoplasms only.... | 2,319,000 | 0.9 | n.a. | n.a. |
| 3. Allergic, endocrine system, metabolic, and nutritional diseases..... | 3,330,000 | 1.3 | 42,127,000 | 5.0 |
| 4. Diseases of the blood and blood-forming organs..... | n.a. | | n.a. | |
| 5. Mental, psychoneurotic, and personality disorders | 25,239,000 | 9.9 | n.a. | |
| 6. Diseases of the nervous system and sense organs | 16,086,000 | 6.2 | 47,103,000 | 5.6 |
| 7. Diseases of the circulatory system.... | 23,175,000 | 9.1 | 89,571,000 | 10.6 |
| 8. Diseases of the respiratory system.... | 71,093,000 | 28.0 | 198,357,000 | 23.4 |
| 9. Diseases of the digestive system | 17,421,000 | 6.8 | 72,695,000 | 8.6 |
| 10. Diseases of the genito-urinary system | 8,800,000 | 3.5 | 42,280,000 | 5.0 |
| 11. Maternity and complications | 6,319,000 | 2.5 | 4,238,000 | 0.5 |
| 12. Diseases of the skin and cellular tissue | 4,131,000 | 1.6 | 47,243,000 | 5.5 |
| 13. Diseases of the bones and organs of movement..... | 14,444,000 | 5.7 | 84,602,000 | 10.0 |
| 14. Congenital malformations | n.a. | | n.a. | |
| 15. Certain diseases of early infancy | n.a. | | n.a. | |
| 16. Symptoms, senility, and ill-defined conditions | 20,707,000 | 8.1 | 143,605,000 | 17.0 |
| 17. Accidents, poisoning, and violence ... | 14,500,000 | 5.7 | 36,955,000 | 4.4 |
| Total | 254,331,000 | 100.0 | 846,680,000 | 100.0 |

Source: Based on Department of National Health and Welfare and Dominion Bureau of Statistics, Illness and Health Care in Canada, Canadian Sickness Survey, 1950-51, Ottawa: Queen's Printer, 1960.
Department of National Health and Welfare, Hospital Care in Canada: Recent Trends and Developments (unpublished manuscript).
Dominion Bureau of Statistics, Hospital Morbidity in 8 Provinces (unpublished manuscript)
Mental Health Statistics 1960, Ottawa: Queen's Printer, 1962. Tuberculosis Statistics 1960, Ottawa: Queen's Printer, 1962.

Note: The Canadian Sickness Survey was a sample survey and therefore produced estimates only for those items where sufficient frequencies were reported. Thus it yielded no figures on tuberculosis, malignant neoplasms and mental disorders. For these groups of diseases the estimated days spent in hospital were added as days of disabling illness; but days of disabling illness outside hospitals and days of non-disabling illness for these groups could not be estimated. No such substitution was attempted, however, for diagnostic classes 4, 14 and 15 which together amount to only 1.3 per cent of all hospital days which would be 0.3 per cent of all disability days.

TABLE 8
ESTIMATED NUMBER AND DISTRIBUTION OF PATIENT-DAYS
AND CASES (SEPARATIONS) IN ALL HOSPITALS, BY DIAGNOSTIC CLASS,
CANADA, 1960

| Diagnostic Class | Days | | Cases ¹ | |
|---|------------|----------|--------------------|----------|
| | No. | Per Cent | No. | Per Cent |
| Total | 65,100,000 | 100.0 | 3,160,000 | 100.0 |
| 1. Infective and parasitic diseases | 3,958,000 | 6.1 | 48,000 | 1.5 |
| of these, tuberculosis only ¹ | 3,322,000 | 5.1 | 13,000 | 0.4 |
| 2. Neoplasms | 2,992,000 | 4.6 | 145,000 | 4.6 |
| of these, malignant neoplasms only ... | 2,319,000 | 3.6 | 79,000 | 2.5 |
| 3. Allergic, endocrine system, metabolic, and nutritional diseases | 1,197,000 | 1.8 | 69,000 | 2.2 |
| 4. Diseases of the blood and blood-forming organs | 224,000 | 0.3 | 13,000 | 0.4 |
| 5. Mental, psychoneurotic, and personality disorders | 25,239,000 | 38.9 | 42,000 | 1.3 |
| 6. Diseases of the nervous system and sense organs | 3,254,000 | 5.0 | 120,000 | 3.8 |
| 7. Diseases of the circulatory system.... | 5,124,000 | 7.9 | 202,000 | 6.4 |
| 8. Diseases of the respiratory system.... | 3,216,000 | 4.9 | 445,000 | 14.1 |
| 9. Diseases of the digestive system | 3,740,000 | 5.7 | 344,000 | 10.9 |
| 10. Diseases of the genito-urinary system | 2,281,000 | 3.5 | 221,000 | 7.0 |
| 11. Maternity and complications | 3,740,000 | 5.7 | 586,000 | 18.5 |
| 12. Diseases of the skin and cellular tissue | 599,000 | 0.9 | 63,000 | 2.0 |
| 13. Diseases of the bones and organs of movement | 1,870,000 | 2.9 | 85,000 | 2.7 |
| 14. Congenital malformations | 449,000 | 0.7 | 25,000 | 0.8 |
| 15. Certain diseases of early infancy | 187,000 | 0.3 | 13,000 | 0.4 |
| 16. Symptoms, senility, and ill-defined conditions | 598,000 | 0.9 | 60,000 | 1.9 |
| 17. Accidents, poisoning, and violence ... | 3,029,000 | 4.7 | 240,000 | 7.6 |
| 18. Supplementary class, including newborn | 3,403,000 | 5.2 | 439,000 | 13.9 |

¹ Includes about 500,000 days of non-tuberculous patients in tuberculosis hospitals.

² Some items revised from original table.

Source: Based on Department of National Health and Welfare, *Hospital Care in Canada: Recent Trends and Developments* (unpublished manuscript).

Dominion Bureau of Statistics, *Hospital Morbidity in 8 Provinces* (unpublished manuscript); *Mental Health Statistics 1960*, Ottawa: Queen's Printer, 1962; *Tuberculosis Statistics 1960*, Ottawa: Queen's Printer, 1962.

TABLE 9
ESTIMATED DISTRIBUTION OF
PHYSICIANS' SERVICES, BY DIAGNOSTIC CLASS

| Diagnostic Class | Per Cent |
|---|----------|
| 1. Infective and parasitic diseases | 5.4 |
| of these, tuberculosis only | 0.3 |
| 2. Neoplasms | 5.8 |
| of these, malignant neoplasms only | 5.1 |
| 3. Allergic, endocrine system, metabolic, and nutritional diseases .. | 2.0 |
| 4. Diseases of the blood and blood-forming organs | 0.9 |
| 5. Mental, psychoneurotic, and personality disorders | 1.7 |
| 6. Diseases of the nervous system and sense organs | 3.9 |
| 7. Diseases of the circulatory system | 5.2 |
| 8. Diseases of the respiratory system | 15.1 |
| 9. Diseases of the digestive system..... | 9.6 |
| 10. Diseases of the genito-urinary system | 8.7 |
| 11. Maternity and complications | 11.3 |
| 12. Diseases of the skin and cellular tissue..... | 8.3 |
| 13. Diseases of the bones and organs of movement | 7.2 |
| 14. Congenital malformations..... | 0.3 |
| 15. Certain diseases of early infancy..... | 1.3 |
| 16. Symptoms, senility, and ill-defined conditions..... | 6.6 |
| 17. Accidents, poisoning, and violence | 6.7 |
| Total | 100.0 |

Source: Based on data derived from information kindly made available by Physicians' Services Incorporated, Toronto.

Note : The coding of the source records did not permit an estimate of preventive services (to well people); the distribution between classes 3 and 4, and 12 and 13 is estimated. The count of services includes office, home, night, and hospital calls as well as special procedures.

TABLE 10
ESTIMATED DISTRIBUTION OF DRUG PRESCRIPTIONS,
BY DIAGNOSTIC CLASS, CANADA, 1960

| Diagnostic Class | Per Cent of Total Visits |
|---|-----------------------------|
| 1. Infective and parasitic diseases | 0.5 |
| of these, tuberculosis only | n.a. |
| 2. Neoplasms | 0.3 |
| of these, malignant neoplasms only | 0.3 |
| 3. Allergic, endocrine system, metabolic, and nutritional diseases... | 7.0 |
| 4. Diseases of the blood and blood-forming organs | 2.8 |
| 5. Mental, psychoneurotic, and personality disorders | 3.7 |
| 6. Diseases of the nervous system and sense organs | 5.3 |
| 7. Diseases of the circulatory system | 16.2 |
| 8. Diseases of the respiratory system | 16.7 |
| 9. Diseases of the digestive system | 8.2 |
| 10. Diseases of the genito-urinary system | 4.4 |
| 11. Maternity and complications | 3.5 |
| 12. Diseases of the skin and cellular tissue | 4.2 |
| 13. Diseases of the bones and organs of movement | 4.6 |
| 14. Congenital malformations | - |
| 15. Certain diseases of early infancy | 0.2 |
| 16. Symptoms, senility, and ill-defined conditions | 5.4 |
| 17. Accidents, poisoning, and violence | 4.5 |
| 18. Supplementary class | 12.5 |
| Total | 100.0 |

Source: Based on Lea Associates, Inc., Canadian Disease and Therapeutic Index, a study of Physi-
cian Practice, February-May 1960, Flourtown, Pa.

TABLE 11
ESTIMATED PERCENTAGE DISTRIBUTION OF HOME NURSING VISITS,
BY DIAGNOSTIC CLASS, CANADA, 1961

| Diagnostic Class | Per Cent of Total Visits |
|--|-----------------------------|
| 1. Infective and parasitic diseases..... | 1.8 |
| of these, tuberculosis only | 1.0 |
| 2. Neoplasms | 7.3 |
| of these, malignant neoplasms only | 7.0 |
| 3. Allergic, endocrine system, metabolic and nutritional diseases... | 11.1 |
| 4. Diseases of the blood and blood-forming organs | 6.8 |
| 5. Mental, psychoneurotic, and personality disorders | 0.7 |
| 6. Diseases of the nervous system and sense organs | 11.0 |
| 7. Diseases of the circulatory system | 11.9 |
| 8. Diseases of the respiratory system | 1.5 |
| 9. Diseases of the digestive system..... | 3.8 |
| 10. Diseases of the genito-urinary system..... | 1.8 |
| 11. Maternity and complications | 9.2 |
| 12. Diseases of the skin and cellular tissue..... | 1.6 |
| 13. Diseases of the bones and organs of movement | 5.5 |
| 14. Congenital malformations..... | 0.2 |
| 15. Certain diseases of early infancy..... | 0.1 |
| 16. Symptoms, senility, and ill-defined conditions..... | 4.3 |
| 17. Accidents, poisoning, and violence | 3.4 |
| 18. Supplementary class, including newborn | 18.0 |
| Total | 100.0 |

Source: Based on total visits (medical-surgical, maternity, newborn, other health instruction and other visits) according to Dominion Bureau of Statistics: Statistics of Home Nursing Services (Victorian Order of Nurses for Canada), 1961, Ottawa: Queen's Printer, 1962.

Maternity visits were added to diagnostic class 11; newborn, other health instruction and other visits to class 18 (supplementary classification).

TABLE 12

ESTIMATED VALUE OF PRODUCTIVITY LOST THROUGH PHYSICAL ILLNESS, 1961

| | |
|---|------------|
| I | |
| A. Average number of calendar days lost by gainfully employed..... | 8.5 |
| B. Average number of calendar days lost by gainfully employed, as a result of physical illness $\left(\frac{94}{100} \times 8.5\right)$... | 8.0 |
| C. Average number of working days lost by gainfully employed, as a result of physical illness $\left(\frac{239}{365} \times B\right)$ | 5.2 |
| D. Number of gainfully employed..... | 6,049,000 |
| E. Total working days lost by gainfully employed, as a result of physical illness (D x C)..... | 33,893,600 |
| II | |
| F. Number of people (excluding housewives) aged 25-64, in severely and totally physically disabled group unable to be employed at all (1951)..... | 134,000 |
| G. Number of people, aged 15-24, in severely and totally physically disabled group, unable to be employed at all (1951)..... | 35,641 |
| H. Total number of people (excluding housewives) in labour force age range (15-64) unable to be employed because of physical disability (1951) (F + G) | 169,641 |
| I. Total number of people (excluding housewives) in labour force age range (15-64) unable to be employed because of physical disability, (1961) $\left(\frac{130}{100} \times H\right)$ | 220,533 |
| J. Total number of working days lost by I. (I x 239)..... | 52,707,387 |
| III | |
| K. Total number of working days lost (E + J)..... | 86,600,987 |
| L. Total number of working years lost $\left(\frac{K}{239}\right)$ | 362,347 |

IV

| | |
|--|-------------------------|
| M. (a) Wages, salaries and supplementary labour income... | \$ 18,884,000,000 |
| (b) Military pay and allowances..... | 550,000,000 |
| (c) Accrued net income of farm operators from farm production | \$ 937,000,000 |
| (d) Net income of non-farm unincorporated business | \$ <u>2,249,000,000</u> |
| N. Total earned income (Total of M.)..... | \$ 22,620,000,000 |
| O. Mean earned income ($\frac{N}{D}$) | \$ 3,739 |

V

| | |
|--|------------------|
| P. Value of total productivity lost through physical illness in 1961 (L x O)..... | \$ 1,354,815,433 |
|--|------------------|

NOTES

- A. Source: Dominion Bureau of Statistics, *Disability Among the Gainfully Employed, Canadian Sickness Survey, 1950-51*, Ottawa: Queen's Printer, 1961, p. 15.
- B. Six per cent of calendar days lost in Civil Service 1961 were due to mental disorders. Assume same rate applies to entire labour force.
- C. $239 = 365 - [(52 \times 2) + 10 + 12]$
Explanation: 52 weeks, 2 non-working days each week,
10 days annual leave, and 12 days statutory holidays.
- D. Source: Dominion Bureau of Statistics, *Labour Force Survey, 1961*, Ottawa: Queen's Printer 1962.
- F. Source: Department of National Health and Welfare and Dominion Bureau of Statistics, *Illness and Health Care in Canada, Canadian Sickness Survey, 1950-1951*, Ottawa: Queen's Printer, 1960.
- G. Let number in this group be x. Assume that $\frac{x}{134,000} : \frac{15.4\%}{57.9\%}$ That is, x is
to the number in the 25-64 physically disabled age group as the percentage
of the population in age group 15-24 is to the percentage of population in
age group 25-64.
- I. Population of Canada increased 30 per cent from 1951 to 1961. Assume number
of people in H also increased by 30 per cent.
- J. See C above for explanation of 239.
- L. See C above for explanation of 239.

M. Source: Dominion Bureau of Statistics, *National Accounts, 1961*, Ottawa: Queen's Printer, 1962.

O. Measure of the productivity of the average worker in a year.

Description

The table attempts to evaluate the indirect cost (loss of productivity) due to physical illness in Canada in 1961. This is a crude estimate based, in some cases, upon questionable assumptions. The method can be refined to any desired extent, as far as data are available, if thought to be a valuable piece of information.

The indirect cost of illness can be defined as the loss in productivity resulting from the inability to work (due to sickness) of people who would otherwise be in the labour force. Additional losses which arise from members of the labour force working, but at reduced capacity because of minor physical ailments or because of worry over a sick relative, cannot be measured and thus are ignored.

In order to evaluate productivity loss, we assume that an individual's contribution (in productivity) is measured by his earned income. Therefore, this analysis has had to overlook the productivity loss due to illness of those people who, if not sick, would still not be in the labour force. Like the National Accounts, therefore, this estimate has ignored the productivity of a population group such as housewives. This leads to an underestimation of total productivity lost.

The analysis begins with the group of gainfully employed. In 1951, the *Canadian Sickness Survey* reported that an average of 8.5 calendar days a year were lost due to sickness by each gainfully employed person. We assume that this rate also held in 1961 and that 6.1 per cent of these calendar days were lost as a result of mental illness, as was the case in the Civil Service in 1960.¹ Therefore, approximately one-half a day a year was lost as a result of mental disability, leaving eight days lost as a result of physical disability. These eight calendar days were converted to working days by multiplying them by the number of working days a year divided by the number of calendar days a year. The average number of working days lost due to physical illness by the gainfully employed multiplied by the number of gainfully employed gives the total number of working days lost by the gainfully employed as a result of physical illness.

The second group is composed of people severely and totally physically disabled, who cannot be employed at all. The number of these people in 1951 in the age group 25-64, excluding housewives, was 134,000. To obtain an estimate of the number of people in the age group 15-24 who were physically

¹Dominion Bureau of Statistics, *Illness in the Civil Service 1960*, Ottawa: Queen's Printer, 1962.

disabled to the extent that they could not be employed, it is assumed that this number (x) bears the same relation to the similarly disabled in age group 25–64 as the population in age group 15–24 bears to the population in age group 25–64.

The total number of people, excluding housewives, in the labour force age range (15–64) unable to be employed at all is the total of the number of such people in the age groups 15–24 and 25–64. It was assumed that the number of people in this category increased over the decade in the same proportion as the total population increased. Thus, to obtain the number of people in this category in 1961, the 1951 figure was inflated by 30 per cent.

Since each of these 220,533 disabled people in 1961 lost all of the working days in 1961 (239) their number (220,533) was multiplied by 239.

The total number of working days lost by the gainfully employed and the totally disabled, because of physical illness, equals the sum of the two. To find the total number of working years lost this figure was divided by 239.

To evaluate these working years lost, we must know the mean earned income per working year. The sum of the four parts of item “M” (from the National Accounts) gives the total earned income. Total earned income divided by the number of gainfully employed (those who earned the income) gives the mean earned income. This is the measure of the value of the productivity of the average income earner. The value of the productivity lost through physical illness is equal then to the mean earned income multiplied by the total working years lost.

TABLE 13

ESTIMATED VALUE OF PRODUCTIVITY LOST THROUGH MENTAL ILLNESS, 1961

| I – In Institutions | |
|--|------------|
| A. Total number of patient days in institutions. | 25,083,712 |
| B. Number of patient days spent in institutions by people in the working force age range $\left(\frac{75}{100} \times A\right)$ | 18,812,784 |
| C. Number of patient days spent in institutions by men in the working force age range $\left(\frac{B}{2}\right)$ | 9,406,392 |
| D. Number of working days lost by men in the working force age range $\left(\frac{239}{365} \times C\right)$ | 6,159,254 |

| | |
|---|-------------|
| E. Number of patient days spent in institutions by women in the working force age range $\left(\frac{B}{2}\right)$ | 9,406,392 |
| F. Number of working days lost by women in the working force age range $\left(\frac{239}{365} \times \frac{E}{2}\right)$ | 3,079,627 |
| G. Total number of working days lost by men and women (who would ordinarily be working) due to days spent in institutions | 9,238,881 |
| H. Total number of working years lost by G above $\left(\frac{G}{239}\right)$... | 38,656 |
| I. Value of productivity lost by men and women, potential labour force numbers, in institutions (H x \$3,739)..... \$ | 144,534,784 |

II – Not in Institutions

| | |
|--|------------|
| J. Average number of calendar days lost by gainfully employed as a result of mental illness $\left(\frac{6}{100} \times 8.5\right)$... | .5 |
| K. Average number of working days lost by gainfully employed as a result of mental illness $\left(\frac{239}{365} \times J\right)$ | .33 |
| L. Number of gainfully employed..... | 6,049,000 |
| M. Total number of working days lost by gainfully employed, as a result of mental illness (K x L)..... | 1,996,170 |
| N. Total number of working years lost by M above $\left(\frac{M}{239}\right)$... | 8,352.2 |
| O. Value of productivity lost by gainfully employed, as a result of mental illness (8,352.2 x \$3,739) \$ | 31,228,876 |

III – Total (I and II)

| | |
|--|-------------|
| P. Value of productivity lost by men and women (who would ordinarily be working) due to days spent in institutions and the value of productivity lost by gainfully employed (I + O)..... \$ | 175,763,660 |
|--|-------------|

NOTES

A. 1. Source: Dominion Bureau of Statistics, *Mental Health Statistics, 1960*,
Ottawa: Queen’s Printer, 1962.

- B. 1. Working force age range had to be taken as 20 years – 69 years, because of the age groups given in sources.
2. Men and women “first admissions” in the labour force age range were about 75% of all “first admissions” (Dominion Bureau of Statistics, *op. cit.*).
- C. Assume that one-half the patient days are accounted for by men and one-half by women.
- D. $239 \div 365 - [(52 \times 2) + 10 + 12]$
 Explanation: 52 weeks, 2 non-working days each week,
 10 days annual leave and 12 days statutory holidays.
- F. Assume that one-half the women patient days are accounted for by women who in the absence of illness would be in the labour force.
- I. \$3,739 was the mean earned income in Canada in 1961; see Table 12.
- J. 1. Six per cent of the absenteeism rate was due to mental disorders in the Civil Service in 1960 (Dominion Bureau of Statistics).
Illness in the Civil Service, 1960, Ottawa: Queen’s Printer, 1962.
2. 8.5 calendar days per person per year were lost due to all sickness. (See Table 12).

Description

The accompanying table attempts to evaluate the indirect cost of mental illness in Canada in 1961. These results are preliminary and at this stage are intended only to illustrate one method of evaluating indirect cost or productivity lost.

The same two general reservations apply to this estimate as to the estimate of the indirect cost of physical illness. First, only total disability, whether temporary or permanent, is included. This means that the loss in productivity of people at work, but performing at reduced capacity, has not been considered. Second, productivity lost only by people, who in the absence of illness would be in the labour force, is evaluated.

The extent of total disability is estimated from two components: those people in the labour force age group, but not in the labour force because of a permanent or chronic disability, and those people in the labour force who are temporarily prevented from working. Those people who are mentally disabled to the extent that they cannot be employed and yet do not spend any time in institution could not be included.

It was assumed that all the people in the labour force age range who had a permanent or chronic mental disability spent some time in an institution. Therefore, the productivity lost as a result of these people’s inability to work is based upon the total number of patient days (25,083,712) spent in institutions in 1961.

About 75 per cent of the people in institutions are estimated to be within the labour force age range. It was assumed that the number of days spent in institutions by people in the labour force age range was 75 per cent (18,812,784) of total days (25,083,712) so spent. Of the number of patient days spent in institutions by people in the labour force age range (18,812,784) it was assumed that one-half (9,406,392) were accounted for by men and one-half (9,406,392) by women.

Presumably, all the men would be working if not institutionalized. Altogether, therefore, they lose 6,159,254 working days. Assuming that only one-half the women who are institutionalized would otherwise be working, 3,079,627 working days are lost by women.

The total number of working days lost is divided by 239 (number of working days a year) to obtain the total number of working years lost. These years are evaluated by multiplying by the mean earned income (\$3,739) in 1961. The estimate of the value of the productivity lost by potential labour force members because of institutionalized days is \$144,534,784.

The working time lost by people in the labour force who are only temporarily prevented from working is estimated on the basis of absenteeism figures for the Civil Service. These figures indicate that about 6 per cent of the time lost was due to psychiatric disorders of various degrees. Applying the Canadian Sickness Survey rate of 8.5 calendar days lost per person per year for all sickness, it was found that an average of one-half a calendar day per person per year is lost as a result of mental disorders. These calendar days, converted to working days (.33) and multiplied by the number of *gainfully employed* (6,049,000) gives the total number of working days lost by the *gainfully employed* (1,996,170) as a result of mental disorders. These working days converted to working years (8,352.2) and multiplied by the mean *earned income in 1961* (\$3,739) gives the value of the productivity lost (\$31,228,876) by the gainfully employed as a result of any mental illness.

